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COMPUTERWORLD

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Next week: An exclusive excerpt from *The Ultimate Entrepreneur,* a soon-to-be-published book about Ken Olsen and DEC, by *Computerworld* editors Glenn Rifkin and George Harrar.

Hopes sag in OS/2 campaign

BY STEPHEN JONES
CW STAFF

The gee-whiz novelty that sparked initial interest in OS/2 has been displaced by the cold, hard facts of the corporate pocketbook. With little immediate bang for the buck, a growing chorus of observers sees little chance of OS/2 becoming the operating system of choice until midway through the next decade.

Expensive memory upgrades and a paucity of new OS/2 applications have stemmed what appeared at first to be a strong wave of interest in the operating system developed by Microsoft Corp. and IBM. Microsoft was so encouraged by OS/2's cozy reception that Chairman Bill Gates

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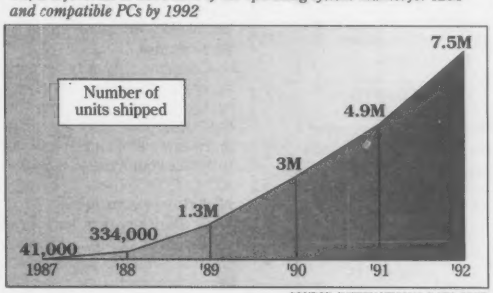
Uphill climb

OS/2 is forecast to have 25% of the operating system market for IBM and compatible PCs by 1992



SOURCE: INTERNATIONAL DATA CORP.
CW CHART

IBM gives blessing to multivendor nets

Products link SNA to international standard

BY PATRICIA KEEFE
CW STAFF

NEW YORK — IBM apparently got the message.

Last week, the firm responded to the rising cry from users for multivendor connectivity with a series of products supporting key international standards that will connect its Systems Network Architecture with rival vendors' communications environments.

"We are committed to doing whatever is necessary to give customers what they require [to communicate enterprisewide]," said IBM Vice-President William O. Grabe. "We will do whatever it takes."

Grabe was not kidding. IBM not only provided product availability dates but went so far as to bless the Open Systems Interconnect model with a spot under the Systems Application Architecture umbrella. Among announcement highlights were the following:

- OSI/Communications Subsystem. Leaving SNA intact, this will allow IBM systems to communicate with other systems using comparable OSI protocols. It also provides OSI network management as well as FTAM and future X.500 support.
- OSI/File Services, a licensed program that provides file transfer and management between IBM and non-IBM equipment using comparable OSI protocols.
- An array of X.400 electronic messaging services, including Open Systems Message Exchange program offerings that feature X.400 capabilities previously available from IBM only overseas (see chart page 136).
- TCP/IP for MVS, rounding out IBM's suite of Transmission Control Protocol/Internet Protocol support.
- 8232 LAN Channel Station, which connects IBM 370s to

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Inside

For the full lowdown on IBM's networking rollouts, see page 136.

GM, Boeing to relinquish MAP/TOP crown

BY ELISABETH HORWITT
CW STAFF

CHICAGO — The MAP/TOP Users Group held its last official meeting as an independent organization last week.

As Boeing Computer Services and General Motors Corp. announced that they would be stepping down from leadership of the Technical and Office Protocol and Manufacturing Automation Protocol standards efforts, respectively, the group announced that it will be absorbed into a new organization with broader technological aims.

The MAP/TOP Users Group will become a division of the Information Technology Requirements Council, a vendor and user organization that is scheduled to start meeting early next year, MAP/TOP Users Group spokesmen said.

The council's long-term purpose is to go beyond networking technologies to provide vendors with input on user requirements for a range of information technologies, including networking, application interfaces, languages and operating systems, the

Continued on page 8

Transient OSF searches for itself

BY STANLEY GIBSON
and AMY CORTESE
CW STAFF

In early July, software developer Simon Patience arrived in Boston from England, bound for his new job at the Open Software Foundation in Lawrence, Mass. One wrong turn later, he sat in a rented Lincoln Town Car in downtown Boston, 30 miles from his destination, lost.

Even for those familiar with the highways of Eastern Massachusetts, getting lost in search of the Open Software Foundation, commonly known as OSF, is easy to do. The temporary headquarters of the OSF is a nondescript office building in an obscure office park in a suburb far from Boston.

Even for those who find the OSF, it is not clear there is any there there, to borrow from Gertrude Stein's appraisal of Oakland, Calif.

LIGHT MECHANICS STUDIO

OSF's John Paul *looks ahead*

Patience and other OSF players, while diligently trying to learn their parts, may be faced with plot turns not of their making. There is the inescapable reality that they are minor characters in a drama that is being written by others. Not only could the authors of OSF change the story line, but much depends on an outside force — AT&T.

Should AT&T join, many rules may be rewritten. If

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"The momentum that we thought would be slow for OS/2 in the first place is even slower than we had expected."

BILL HIGGS
INFOCORP

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Computer time bomb defused; felon nailed

BY J. A. SAVAGE
CW STAFF

FORT WORTH, Texas — At about 3 a.m. on a Saturday morning, Donald Gene Burleson broke into the offices of USPA, Inc. and IRA, Inc. and sat down at his old terminal. He signed on and signed off. He immediately signed back on with a three-day-old security password that let him perform his old job — computer security officer. He then erased 168,000 payroll records on the company's IBM System/38 and invoked a time bomb intended to erase records on a monthly basis.

Burleson had been fired three days before, on Sept. 18, 1985.

In a case that was initially considered too technical to pursue, a jury, including three computer professionals, convicted Burleson on a felony charge of harmful access to a computer last week. He faces up to 10 years in prison.

Computer security experts agree that the case will likely not deter this criminal activity, but the precedent may persuade more law enforcement officials to pursue computer criminals.

Not clever enough

While Burleson may have been clever about covering his audit trail, the break-in and a coincidental weekend work session of a fellow programmer led to his discovery.

"He was having continual conflict with the company and anticipated being fired," said Davis McCown, Tarrant County assistant district attorney. McCown said that the time bomb was created in a new account, which Burleson gave a name beginning with the letter Q — the same letter that begins account names provided in IBM software — so it would remain undetected. Burleson apparently used it to create a program that gave it security clearance. According to McCown, he tied this program, which was intended to erase files, to legitimate files and put it on a time switch.

The company, an insurance and brokerage firm, made a cursory check of the accounts after Burleson was fired but did not find the hidden account, according to McCown. Computer system officials at the company would not comment.

Saturday morning, after Burleson's break-in, a programmer came into the office to figure out how a new bonus system would affect the company's payroll. McCown said that every time the programmer ran the simulations, the payroll came up with zeros, signaling that the initial payroll deletion had occurred. This led the company to shut down the computer for two days to cleanse the system, a move that allowed the time bomb to be discovered.

McCown, who had little past experience with computers, said he wanted to pursue the case even though the district attorney thought it was too technical to try and was willing to negotiate out of court. The jury was more technical than most, McCown said; it included one systems analyst and two computer designers.

AP/WIDEWORLD
Computer felon Burleson

Also, the case was not attractive to the prosecution because the actual damages were rather small; the county only proved $12,000 in damages for downtime and the cost to fix the payroll accounts.

"In the scheme of things, it was not a large loss. But 550 people didn't get their checks for a week or two, and if the program had gone off as planned, it would have created havoc," McCown said.

Show some spine

The conviction most likely will help other prosecutors overcome an apparent fear of prosecuting high-tech crime cases, McCown said.

"One of the most pressing needs in the criminal area of viruses is the education of attorneys," said John McAfee, chairman of the Santa Clara, Calif.-based Computer Virus Industry Association. McAfee noted that there has been a recent rapid increase in requests for virus-related information from police organizations.

The Burleson case is thought to be the first to win a felony conviction. A 1985 case involving a similar time bomb planted by a disgruntled employee in Minneapolis only involved a misdemeanor, although the original charge was extortion. Burleson will be sentenced Oct. 21.

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6. Identify plan	
7. Rebind plan	
8. Inform CICS	
9. Test	

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Executive changes at IBM

BY NELL MARGOLIS
CW STAFF

ARMONK, N.Y. — IBM last week ended weeks of industry rumor and speculation by naming Vice-President and former World Trade Asia/Pacific Group chief Richard T. Gerstner general manager of Personal Systems. Gerstner, with 28 years of IBM experience to his credit, has held several executive posts at the company; as chief of Personal Systems, he will report to Senior Vice-President and General Manager of IBM United States Terry R. Lautenbach.

Succeeding Gerstner at Asia/Pacific is Edward E. Lucente, the

IBM's Gerstner

IBM vice-president who has been overseeing the company's stateside consolidations since July, when he was replaced at the helm of the U.S. Marketing and Services Group by George H. Conrades.

Gerstner's new post had been vacant since July, when Conrades moved to general manager of U.S. Marketing and Services. It has recently been the focus of a whirlwind of attention from industry observers, who saw in IBM's failure to award the job to heir apparent and Personal Computer Division President William Lowe a mark of the company's displeasure with its PC sector performance.

"I wouldn't doubt that [IBM] overlooked Lowe as punishment for bad performance," said Dataquest Inc. analyst Robert Cameron.

While the Gerstner and Lucente appointments eliminated some of the guesswork prevalent among IBM watchers, Lowe's corporate fate still poses a question mark.

"I would be extremely surprised if his unit weren't consolidated under [IBM's Communications Products Division]," said Brian Jeffery, managing director of Los Altos, Calif.-based market research firm International Technology Group.

Apple delivers a Mac attack to business users

BY JULIE PITTA
CW STAFF

SAN FRANCISCO — Apple Computer, Inc. last week beat its competitors to the punch with a Motorola, Inc. 68030-based version of its Macintosh personal computer, the most powerful Macintosh yet.

Apple also introduced a configuration of its Motorola 68000-based Macintosh SE. The SE, priced at $5,069, offers 2M bytes of random-access memory and a 40M-byte internal hard disk drive.

In comparison, the original SE — now $3,169 after a recent price increase — offers 1M byte of RAM and a 20M-byte hard disk drive. Sources have said that the new SE model had been held back for a number of months because of the scarcity of memory components.

Introduction of the Mac IIX represents another attempt by Apple to enhance its image as a serious business supplier. The Mac IIX, which Apple is targeting at processing-intensive applications like artificial intelligence and computer-aided design, is a leap forward from the original 128K-byte Mac that debuted in 1984.

The Mac IIX offers a more powerful 16-MHz processor and what Apple calls "a high-density compatible drive" — a 1.44M-byte flexible disk drive that can read and write Microsoft Corp. MS-DOS and OS/2 files when used with Apple File Exchange and 4M bytes of RAM.

The flexible disk drive will not be available for the Mac SE at this time, said Randy Battat, vice-president of product marketing at Apple, because it requires changing RAM, drive-controller chips and the drive itself.

According to Apple, the Mac IIX will be available next month. The product package will include an 80M-byte hard disk drive, a mouse and System 6.0.2, which includes the Apple File Exchange. The price is set at $9,369.

Big bucks, no bang

Users contacted last week were unimpressed with the Mac IIX, in particular its high price tag. "It was anticlimactic," said Mary Howlett, manager of office automation at Hughes Aircraft Co.'s Ground Systems Group. "I was hoping for the portable" Macintosh that has long been expected.

Howlett called the Mac IIX's price "higher than I expected" and said the kits to upgrade Mac IIs to the IIX also carry a hefty price tag. A full-blown upgrade can cost nearly $3,200.

Mike Bailey, a systems integrator at Lockheed Missiles and Space, and Jeff Ehrlich, an MIS manager at General Electric Medical Systems, said the introduction lacked the impact of the Mac SE and Mac II in 1986.

"It's not an extraordinary upgrade," Ehrlich said. "It's an architectural move to get them where they want to be for the new [multitasking] operating system."

"There's no new technology," Bailey concurred. "It's a good machine, but I just don't like the price. It's not very competitive."

Last week's introduction inaugurated "the year of the CPU" almost four months earlier than anticipated. Apple Chairman and Chief Executive Officer John Sculley, who dubbed 1988 "the year of networking," had said there would not be any new CPU announcements this year. He has stated that 1989 would see a number of additions to the Mac family.

In an appearance at the Applefest show here last week, Sculley said he had "underestimated" what Apple's development team could accomplish.

The Mac IIX is the first addition to the Mac line since that product evolved from a closed to an open architecture in 1986. A complaint among business users had been the inability to expand the Macintosh because it lacked any slots for add-in boards. With the debut of the Mac SE and Mac II, Apple eliminated that problem; the Mac SE has one expansion slot, and the Mac II has six.

Industry observers said that while the Mac SE and Mac II were Apple's first credible business machines, the company had to broaden its line to make further inroads with Fortune 1,000 customers. While the Mac IIX is a relatively modest attempt to broaden the line, other systems expected in the coming year are more revolutionary, including a laptop version and a deskside configuration of the Macintosh.

Other vendors are expected to introduce 68030-based workstations shortly. Next, Inc., started by Apple cofounder Steve Jobs, is scheduled to introduce its 68030 workstation, said to run Unix and offer sophisticated graphics, Oct. 12. Sun Microsystems, Inc. will likely introduce a 68030 workstation before the year's end.

Users can upgrade from the Mac II to the Mac IIX through use of a 68851 paged-memory management chip, a flexible disk drive upgrade kit including a drive, appropriate chip sets and a logic board upgrade kit. The paged-memory management chip is priced at $499, the logic board upgrade kit is priced at $2,199 and the drive upgrade kit is priced at $599.

AT&T discounts prompt FCC inquiry

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — The Federal Communications Commission last week launched an investigation to determine just how far AT&T can go in providing discounts to win big customers for long-distance voice and data services.

At issue is AT&T's Tariff 15, which allows the company to offer rate discounts to specific customers in order to compete with rivals such as MCI Communications Corp. [CW, May 16]. The first Tariff 15 customer, Holiday Corp.'s chain of Holiday Inns, will get a discount of up to 10%.

The FCC allowed the controversial Tariff 15 to go into effect — much to the dismay of MCI — but said the tariff raises such major legal and policy issues that it will be subjected to a full-scale investigation.

Change in focus

Tariff 15 is a major departure from ordinary tariffs, which establish standard rates that are available to all customers. MCI and other critics said the tariff violates federal rules against discriminatory tariffs and was a lightly veiled attempt at self-deregulation.

AT&T countered that it must have the flexibility to compete with MCI and those other carriers that have attempted to "cherry-pick on a customer-by-customer basis and then block AT&T's efforts to compete."

The FCC investigation could have far-reaching consequences, since it also will examine the legality of MCI's discount pricing and require AT&T, MCI and U.S. Sprint Communications Co. to divulge the discounts they have provided to specific long-distance customers.

The discount for Holiday Inns will enable AT&T to retain nearly $30 million in 1989 revenue that it would otherwise lose to MCI, AT&T's filing said.

Still under investigation is AT&T's Tariff 12, which allows AT&T to offer customized networks to specific customers, notably General Electric Co., Du Pont Co., Ford Motor Co. and American Express Co.

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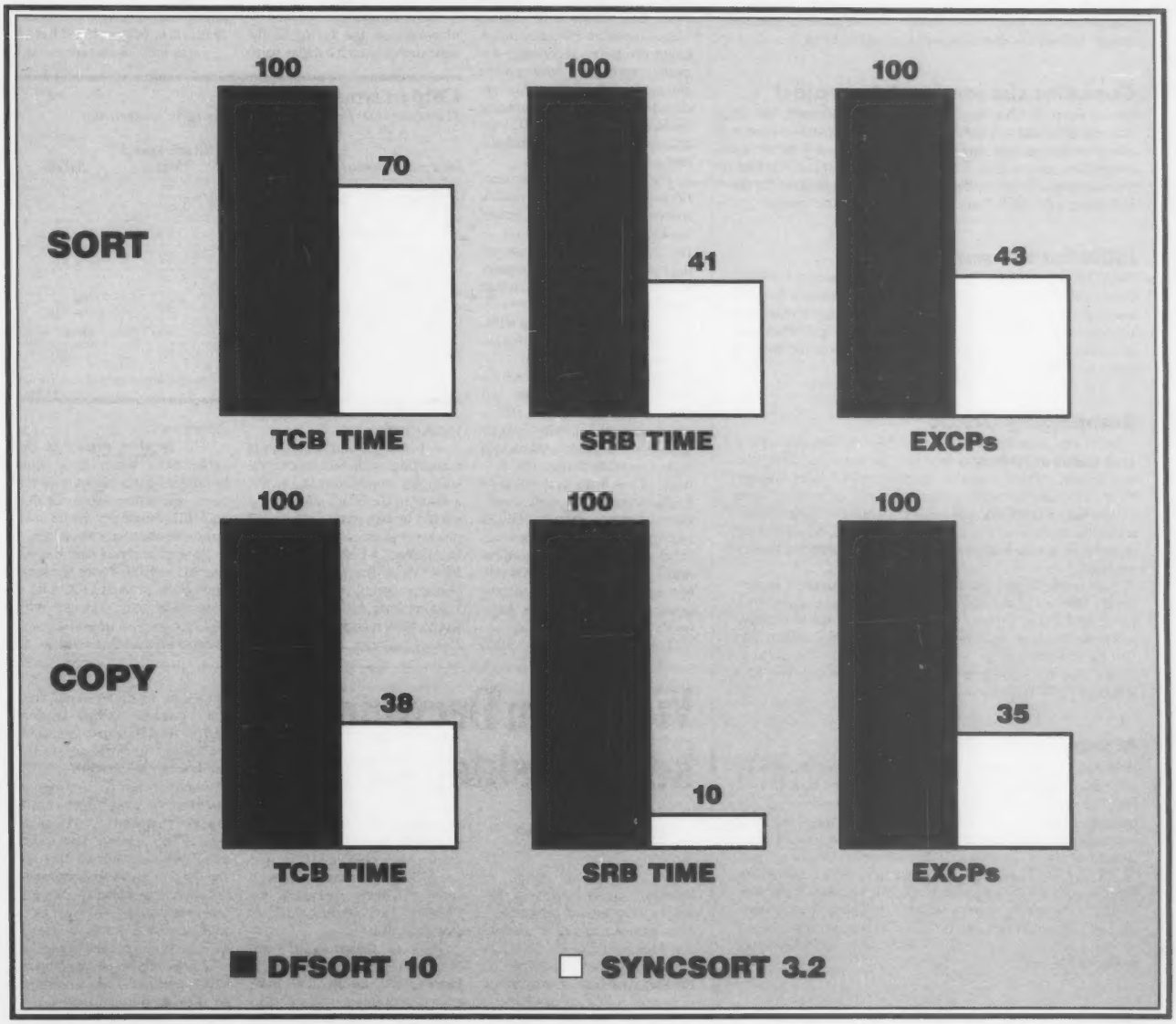

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NEWS SHORTS

Two-for-one standards deal

The Corporation for Open Systems and its European counterpart, the Standards Promotion and Application Group, last week announced plans to combine their International Standards Organization Open Systems Interconnect conformance-testing products into a single tool set. The cooperative agreement initially covers distribution of test suites throughout Europe and North and South America. In the second phase, the groups will work on enhancing the testing products.

Compiler chosen for Ada project

Verdix Corp. in Chantilly, Va., announced last week that its Ada compiler and software development tools will be used in one of the largest Ada programs ever undertaken — more than two million lines of code. The company said that General Electric Co. selected the Verdix Ada Development System for the U.S. Navy's AN/BSY-2 submarine combat control system.

ISDN for the masses

West Communications, the telephone service arm of US West, is now offering Integrated Services Digital Network lines for lease on a custom basis in Portland, Ore., Omaha, Seattle, Minneapolis and Denver. US West will be pricing individual lines according to a customer's network configuration and distance from the central-office switch.

Rampaging Oracle

Oracle Corp. is set to launch its entry into the financial applications market on Wednesday with four packages, including general ledger, accounts payable, purchasing and asset management. The new software will initially run on systems from Digital Equipment Corp. and Sequent Computer Systems, Inc., according to Oracle. The applications are SQL-based and will be portable across multiple environments, a company spokesman said.

Last week, Oracle continued its financial rampage, reporting its 10th straight quarter in which revenue doubled compared with a year earlier. The Belmont, Calif.-based database software developer said revenue jumped to $90.6 million in its first fiscal 1989 quarter, which ended Aug. 31 — a 124% increase over the same quarter last year. Net income was $7.1 million, a 120% increase over a year ago.

Money heals all wounds . . .

IBM and Hughes Aircraft Co. have been none too chummy since Hughes accused IBM of sabotaging its bid on a $3.6 billion Federal Aviation Administration contract. However, the companies declared a truce last week long enough for IBM to sign an agreement in principle for Hughes subsidiary Hughes Communications, Inc. to purchase a minority equity interest in IBM's Satellite Transponder Leasing Corp. (STLC) subsidiary. Hughes will provide exclusive marketing services to corporations and the television news industry, including data networking and video conferencing, for STLC's three satellites, which were manufactured by the Space and Communications Group of Hughes Aircraft.

Dumping 3090s in Boston Harbor?

Citizens for Tax Justice issued a report last week stating that IBM — a big supporter of the Tax Reform Act of 1986 — paid no federal taxes in 1987. The labor-backed research organization said IBM got a $123.5 million refund. But an IBM spokeswoman said the study is wrong and that IBM paid substantially more than the $10 million provision for federal taxes listed in its 1987 annual report.

Privacy act passes Senate

The U.S. Senate last week passed an amended version of the Computer Matching and Privacy Protection Act that will regulate federal computer matching programs that compare personal data [CW, Sept. 5]. The House of Representatives is expected to give the amended bill its final approval shortly.

DEC, Mips make deal official

BY NELL MARGOLIS
CW STAFF

MAYNARD, Mass. — Digital Equipment Corp. swapped tradition for production last week and reached for technology beyond its own labs to those of Sunnyvale, Calif.-based chip maker Mips Computer Systems, Inc. A comprehensive technology-exchange agreement between the companies will harness Mips' reduced instruction set computing (RISC) technology for DEC's escalating assault on the workstation market.

For DEC, the uncharacteristic partnership means a chance to launch a powerful RISC-based workstation that runs Ultrix — DEC's flavor of the Unix operating system — in the near future, significantly earlier than would have been the case had it persisted with plans to develop a RISC architecture in-house, market analysts said.

While no definite product announcements were made last week, William Strecker, DEC's vice-president of product strategy and architecture, confirmed wide speculation that the first fruits of the Mips deal would be in the workstation area; moreover, Robert Palmer, DEC's vice-president and group manager of semiconductor operations said, "I don't think you'll have all that long to wait." Analysts are predicting an early winter debut for the first DEC-Mips entry.

The agreement gives DEC rights to both present and future Mips technology and provides for DEC to become a 5% equity holder in the privately held $30 million-plus California-based company, with an option to boost its interest to 20% and place a director on Mips' board.

Both companies declined to elaborate on the terms of the warrants or attach a dollar value to the contract.

A 4-year-old start-up, Mips is competing with Sun Microsystems, Inc. and Motorola, Inc. for a share of the RISC market, expected by San Jose, Calif.-based market research firm Dataquest, Inc. to reach $15 billion by 1992. RISC chips from Mips are already powering technical workstations from Ardent Computer Corp., Silicon Graphics, Inc. and Prime Computer, Inc.

Being tagged as RISC maker to DEC, said Dataquest analyst Robert Cameron, "isn't just a feather in Mips' cap — it's more like the jewel in the crown."

The fact that Mips is nearing production of a superspeed emitter-coupled logic-augmented RISC microprocessor "sooner than Sun or Motorola will have it . . . was very important to us," Palmer said.

The greatest impact of the agreement, Palmer said, could be on third-party software developers, for whom the forthcoming DEC computers should open up new marketing possibilities.

Several analysts said the advent of the RISC-based workstations could present DEC with a dilemma if they compete with DEC's own Vaxstations as well as entries from other vendors.

Chip in time

Mips claims its processors beat out the RISC competition

Microprocessor	Clock speed (MHz)	MIPS
Advanced Micro Devices AMD 29000	25	12
Motorola 88000	20	13
Fairchild Clipper	33	5
IBM RT PC	6	2
Sun Microsystems Sparc	16	8
Mips R2000	16	12
Mips R3000	25	20

SOURCE: MIPS COMPUTER SYSTEMS, INC.
CW CHART

View from Decwindows key to desktop strategy

BY WILLIAM BRANDEL
CW STAFF

Digital Equipment Corp. is hatching a desktop strategy that will revolve around its Decwindows interface and allow users to run Microsoft Corp.'s MS-DOS and its own Ultrix and VMS on the same machine. The strategy is part of a DEC plan to battle IBM on the desk top by positioning its workstations as windows on a variety of computers.

Key to this strategy, which DEC President Ken Olsen recently said would be set forth by year's end, is Decwindows, which will let users run multiple applications on different operating systems at the same time. The sessions can be viewed on the same screen, according to Phil Auberg, product manager for Decwindows.

The hardware strategy will initially be based on the so-called PVAX, a workstation that uses the same 3 million instructions per second CMOS processor as the Microvax 3000. The PVAX will support VMS and Ultrix and run MS-DOS emulation through software being provided by Phoenix Technologies Ltd. in Norwood, Mass.

Personal computer users will also be able to run a version of Decwindows locally and have transparent, windowed access to VMS and Ultrix sessions through a communications link to a VAX.

"We will be building less expensive, smaller machines, and they will be fully integrated to take advantage of the Decwindows environment," Auberg said. "Decwindows is an entire desktop environment, not a single product on a single implementation. DOS-based [desktop computers] will have transparent access to the VMS and Ultrix applications."

Decwindows is DEC's implementation of the X Windows standard. DEC currently has more than 100 independent software vendors writing applications to its XUI programming interface to take advantage of the windowing environment.

A source close to the program said the vital pieces of the desktop environment — Decwindows VMS, Decwindows DOS and PVAX — would all be available by year's end. Auberg would not confirm availability plans but said Decwindows VMS and Decwindows DOS would be introduced in the same time frame.

The development could boost DEC's position as a low-end vendor, said John Logan, vice-president of the Aberdeen Group, a Boston-based research firm.

"This would give DEC and its OEMs a tremendous advantage over its competitors, especially IBM," Logan said. "Digital says there are presently 700,000 DOS users connected to VAXs, who can be upgraded and tightly coupled through Decwindows and have their choice of DOS, Unix and VMS as well."

With fully loaded IBM Personal System/2s costing $5,000 to $8,000 and PVAXs expected to be priced from $3,200 to $3,500, Logan said DEC will pressure IBM at the low end.

Despite successful ISDN test drive, bank uncommitted

BY KATHY CHIN LEONG
CW STAFF

PORTLAND, Ore. — Even a successful pilot program was not enough to convince the U.S. National Bank that it should sign up for Integrated Services Digital Network (ISDN). The bank still believes implementing the technology is too risky.

After more than a year of testing the ISDN technology from US West, the U.S. National Bank of Portland, Oregon's largest banking concern, has decided to quietly draw its pilot to a close, and although the ISDN lines are now commercially available, the bank has not decided whether it wants to buy the service.

> "WE ARE not going to jump into the water headfirst. We have to exercise extreme prudence because communications is the lifeblood of the bank."
>
> EARL VOGT
> U.S. NATIONAL BANK OF PORTLAND

According to Earl Vogt, U.S. National Bank's telecom manager, the bank considers the tire-kicking experience successful. Vogt said the bank found the technology reliable and useful, but he conceded that users will still be taking a risk with ISDN.

"This is a technology that is fundamentally different," he said. "The RBOCs have to get up to speed, and you have no idea of the reliability of the ISDN hardware vendors."

The ISDN pilot has been a long haul for U.S. National. Originally announced in 1985, the test was late because of software delays in Northern Telecom's central office switch, the DMS-100. This summer, several US West ISDN engineers involved in the bank trial were redeployed, causing several tests to be put on hold.

Since March 1987, the bank tested some 200 ISDN (2B + D, or basic rate interface) lines and prototype ISDN equipment from a variety of hardware vendors, including Amdahl Corp., Codex Corp. and Northern Telecom, Inc. Thirteen of the bank's 96 branches were involved.

The key benefit, Vogt said, is the fact that ISDN technology integrates voice, data and video over the same set of lines, bringing simplicity and manageability to the network.

But while ISDN proved reliable, the test yielded few new applications. One of these was the ability of users to view a caller's number on an LCD display of an ISDN phone.

While Vogt said he would "definitely do it again," he added that the uses for ISDN are limited. "We are not going to jump into the water headfirst. We have to exercise extreme prudence because communications is the lifeblood of the bank."

Vogt said he believes that ISDN "will soon be ubiquitous" but that for today there is little available in equipment and software to justify it. "The key to success initially will be pricing, support and applications," he said.

Vendors, however, contend that ISDN already does bring added value to applications. According to Barbara Sinclair, ISDN planning manager at Codex, the commercial availability of ISDN services today offers users the consolidation of several lines onto a single ISDN line and increased speed for certain applications. She did acknowledge that the arrival of ISDN desktop computing applications is a couple of years away.

U.S. National Bank is the first user to implement an ISDN pilot using Centrex services based on a central office switch shared by regular phone customers. It is using the DMS-100 switch from Northern Telecom.

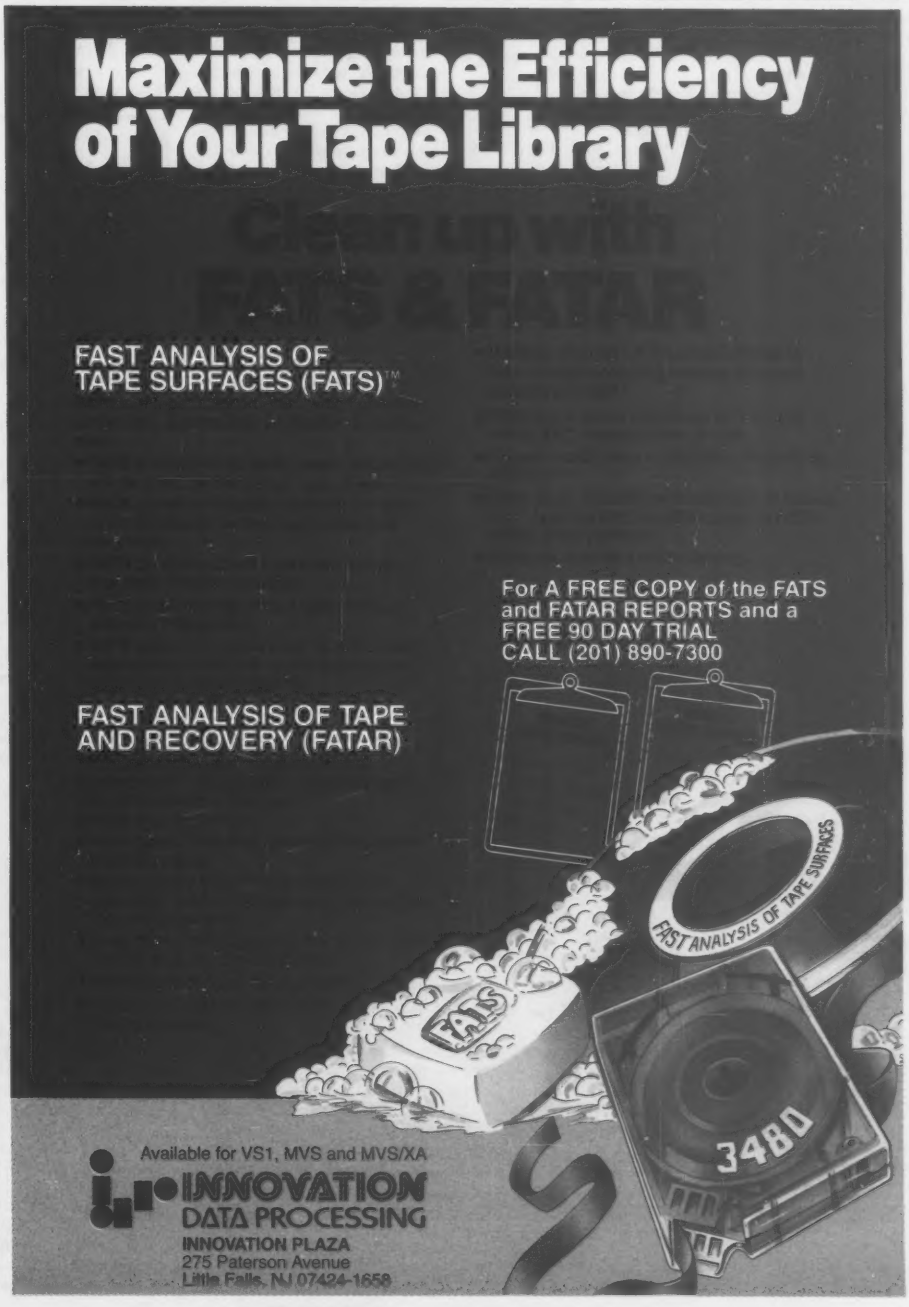
Among the various applications tested were terminal emulation, PC-to-PC communications and facsimile communication. The bank did not test bank-specific applications such as telemarketing and customer support. During the ISDN trial, users included telecommunications analysts as well as bank executives.

A stringent in-house evaluation found that the 200 users rated ISDN technology high on ease of use and reliability. "We were testing ISDN in an environment where we integrated the applications into our everyday work life," Vogt said.

ISDN was not practical in IBM 3270 batch applications, in which people wanted split-second response. However, Vogt said that in data applications such as electronic mail, the response time was more than sufficient.

In PC-to-PC communications, users called ISDN "extremely useful." Data was transmitted at a 64K bit/sec. rate rather than at the slower 1,200 bit/sec. rate.

According to Bob Meldrum, US West's ISDN product manager, ISDN trials at Honeywell Bull, Inc. in Phoenix and the state of Arizona will also be coming to a close.



Hopes sag

FROM PAGE 1

predicted OS/2 would make up 80% of the new operating systems shipped by 1992.

One market research firm, Cupertino, Calif.-based Infocorp, recently slapped an additional two years onto its original prediction that OS/2 would surpass Microsoft's MS-DOS as the dominant operating system by 1992. User concerns as well as an apparent slowdown in third-party development of OS/2 applications helped the firm come to its conclusion that it will not be until 1994 that OS/2 garners at least half of all operating system sales.

Tough requirements

At the heart of OS/2's slow acceptance are its hardware requirements. In addition to the need for high-performance Intel Corp. 80286- or 80386-based computers, OS/2 gobbles up at least 4M bytes of memory. That means spending as much as $4,000 for additional memory for every machine running OS/2 in a company.

Users find little reason to justify such costly upgrades when there are no new applications available to take advantage of the souped-up system.

"There's no reason to go to OS/2 if we have no applications. It wouldn't make any sense," said Phillip Gordon, manager of office systems at Charles Schwab & Co. in San Francisco. Schwab, which is currently in the process of evaluating OS/2, does not plan to make a substantial move to the new operating system before 1993.

That kind of attitude has led industry observers to pull back on OS/2 expectations.

"The momentum that we thought would be slow for OS/2 in the first place is even slower than we had expected," said Bill Higgs, director of software research at Infocorp.

International Data Corp. in Framingham, Mass., paints its own dim picture for OS/2, concluding that "sales have not rocketed" as anticipated and that by 1992, OS/2 will have grabbed only 25% of the market for operating systems on IBM and compatible personal computers.

Much of Wall Street has tested the waters and found little to support Microsoft's claims of 80% market share on new shipments by 1992. "People have just been way too bullish on OS/2," said Robert Therrien, an analyst at Paine Webber, Inc.

With OS/2 being an expensive alternative, users like Schwab's Gordon said they do not mind saving their dollars, even if it means working within the more rigid constraints of character-based MS-DOS.

"DOS is cheaper and technically less of a pain than OS/2," Gordon said. While Schwab waits for a reason to switch to OS/2, the firm will make the most of MS-DOS. One plan calls for context-switching programs, which offer some of the multitasking features that are found in OS/2.

Corporate users in general may have to wait for OS/2's hot graphical user interface for as much as five years, when there are more reasons to justify a hefty budget request for an OS/2-based system.

Microsoft is still sticking to its predictions, anticipating that 70% of new office workstations will be running OS/2 by 1992. However, the company admitted that most users will not embrace OS/2 until a spate of knock-your-socks-off applications are introduced. Without these, it is difficult to justify the costly move to OS/2, said Mark Mackaman, an OS/2 product marketing manager at Microsoft.

> "PEOPLE have just been way too bullish on OS/2."
>
> ROBERT THERRIEN
> PAINE WEBBER

Mackaman said he is confident that as many as 400 OS/2 programs are currently under development.

Fred Thorlin, associate director of software research at Dataquest, Inc., agreed with Mackaman, but not on as grand a scale.

Thorlin said he encountered about 50 developers at a recent Software Publishers Association conference, all of whom are writing applications for OS/2.

Dataquest is staying with its projection that OS/2 will constitute 50% of systems sales by 1991, thanks to applications and lower prices for random-access memory chips.

Most major software developers were not about to give up their claims to the OS/2 market last week, stating that the system is a critical platform that should be reached as quickly as possible.

"We may have cut down on the amount of hyperbole, but we're working just as fervently on OS/2 development in the back rooms," said Ed Esber, chairman of Ashton-Tate Corp.

With the advanced Presentation Manager and LAN Manager versions of the system nearing shipment, OS/2 fever could start to be rekindled. But Microsoft and IBM will have to deliver a stronger panacea than that to cure user apathy.

Jeffrey Tarter, editor of "Softletter" in Cambridge, Mass., concluded, "Without great applications, users could care less about OS/2."

'Sleek look' for Compaq desktops

BY JULIE PITTA
CW STAFF

HOUSTON — It wasn't a laptop.

Compaq Computer Corp. spent nearly as much time answering questions about its phantom laptop computer last week as it did introducing its 20-MHz 80386-based personal computer with a new casing. A number of publications had predicted that Compaq would unveil a laptop based on Intel Corp.'s SX chip last week.

"We are working on a laptop; that's for the future, not for today," said Compaq Chief Executive Officer Rod Canion. "We didn't postpone the introduction of the laptop. It will be announced as planned on the date we planned to announce it." He would not say what that date is.

The system introduced last week completes the conversion from Compaq's old design to what company officials called its "sleek new look," inaugurated with the Deskpro 386S and 386/25 in June.

The new system features an integrated IBM Video Graphics Array graphics controller. Three models are available: the Model 1 with a single 1.2M-byte floppy disk drive; the Model 40, which adds a 40M-byte hard disk drive; and the Model 110 with a 110M-byte hard drive.

Compaq also added a new model to its Deskpro 386/25 system and a 2,400 bit/sec. internal model option for its desktop and portable systems, priced at $599. The Model 60, priced at $8,299, features a 60M-byte hard disk drive.

Compaq is also discontinuing its Deskpro 386 and 386/20. Its new 386 family consists of the smaller footprint Deskpro 386S as the entry-level system, the 386/20E as the mid-range model and the higher end 386/25.

Compaq also used the introduction to tout the Extended Industry Standard Architecture (EISA), the clone makers' alternative to IBM's proprietary Micro Channel Architecture (MCA). EISA will be a 32-bit bus that is compatible with the IBM Personal Computer AT. Products based on the specification are expected to reach the market by the end of next year.

Sensitive that it might be subject to the same charges that the consortium has leveled at IBM — that it is forcing a standard — Compaq is downplaying its role in EISA. "We have acted as a facilitator," said Michael Swavely, Compaq's marketing vice-president.

Compaq officials contend that EISA will out-perform the Micro Channel because of system design. Like Compaq's "flex architecture," EISA will separate the cache memory device from main memory. That, Compaq contended, will allow EISA machines to run faster than IBM's Personal System/2 models.

Not a laptop

Compaq's newest PC is part of a redesign of the company's desktop product line

Compaq Deskpro 386/20E

Microprocessor: Intel 80386
Speed: 20 MHz
Memory: 1M byte of RAM; 82385 cache memory controller
Expansion: Four IBM PC AT-compatible expansion slots; one 32-bit memory expansion slot
Storage: 5¼-in. disk drive standard; space for four mass storage devices
Price: $5,199 for Model 1 with 1M byte of RAM and 1.2M-byte disk drive; $6,599 for Model 40 with 40M-byte hard disk drive; $7,999 for Model 110 with 110M-byte hard drive

CW CHART

MAP/TOP

FROM PAGE 1

MAP/TOP Users Group said in an official statement.

This statement should not be interpreted as an immediate move by the group toward broader standards setting, according to Donald Faulkenberg, acting president of ITRC. "Quite frankly, our immediate goal is directed at the MAP/TOP arena," Faulkenberg said.

According to Boeing's James Doar, chairman of the MAP/TOP executive committee, both Boeing and GM have spent millions of dollars each year funding MAP/TOP Users Group activities. "A couple of years ago, we [Boeing and GM] realized that we could not keep going on like this indefinitely," Doar said.

Doar stressed that the two concerns want to "share the responsibilities" with other corporations in MAP/TOP leadership. For that reason, Doar said, the new Information Technology Requirements Council (ITRC) has been formed to include up to 20 vendor and user companies that will oversee MAP/TOP direction.

Laurie Bride, Boeing's TOP manager, added that Boeing will continue to work as a key contributor to TOP.

The 16-member council, which will consist of one-third vendors and two-thirds users on a rotating basis, "makes a lot of sense" as a way for users to ensure a better vendor response to their needs, said Bruce Richardson, a senior research analyst at Advanced Manufacturing Research, in Salem, Mass.

Companies that have joined the ITRC include: GM, Boeing, Eastman Kodak Co., Apple Computer, Inc., Hewlett-Packard Co., Bechtel Group, Inc., Canadian Standards Organization and the Industrial Technology Institute. Each company participating in the ITRC pays dues of $100,000 annually.

West Coast Bureau Chief Kathy Chin Leong and Systems Editor Rosemary Hamilton contributed to this report.

UB joins MAP turn-away

At last week's MAP/TOP Users Group meeting in Chicago, Ungermann-Bass, Inc. abandoned the official MAP networking standard, 802.4 token-bus, and announced that all of its future MAP-based product development would be based on 802.3 Ethernet and 802.5 token-ring standards.

The vendor said it plans to develop products based on MAP 3.0, TOP 3.0 and government Open Systems Interconnect procurement protocols, which will run on top of either 802.3 Ethernet or 802.5 token-ring. UB's move is in recognition of a clear customer preference for token-ring and Ethernet in the manufacturing workplace, said UB spokesman John Cardis.

UB's perception of the marketplace jibes with a recent AMR user survey that showed Ethernet making up 60% of installed factory networks, said Bruce Richardson, a senior research analyst at AMR. "Putting MAP [software] on top of OSI protocols is a good, positive move."

The company will continue to support its token-bus products, as well as its MAP 2.1 network offerings, which cannot be migrated to the 3.0 standard, Cardis said.

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ORACLE set the world record for performance by running 265 transactions per second (tps) on a 3090-600E class Amdahl* mainframe running the IBM MVS operating system. This breaks the old record of 240 tps set by a cluster of 16 Tandem computers.

ORACLE also set the record for DEC minicomputers by running 49 tps on a VAX 6240 running VMS. This breaks the previous VAX/VMS record of 29 tps set on a VAX 8700 connected to a VAX 8800. ORACLE's results were audited and verified by the Codd and Date Consulting Group. And not only is ORACLE's performance nearly twice as fast as this previous record, but ORACLE's cost per transaction is almost four times better than that of the other system.

ORACLE set a UNIX record of 124 tps on a large minicomputer from Sequent as well. Once again, the results were independently verified by the Codd and Date Consulting Group.

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Unisys fills high-end gap

1100 extension claims high-octane 6.5K transaction/sec.

BY JAMES DALY
CW STAFF

NEW YORK — If Unisys Corp. hawked the same wares as many of its Detroit neighbors, it may have boasted that it was wheeling out a faster car along with the higher octane fuel to run it on.

Of course, Unisys used transactions per second instead of miles per hour last week when it introduced a high-end series of mainframes and a more powerful software architecture that it claimed enables the machines to achieve an industry-best processing rate of 6.5K transaction/sec.

Observers said the 11-member 2200/600 series should go a long way toward slowing the leak of power-hungry Unisys customers to other vendors.

Unisys tempered the announcement, however, with news that the delivery date of its 2200/400 mid-range system will be pushed back three months to March 1989 in order to squash bugs involved in getting older 1100 series peripherals to work with the new machines, Chief Executive Officer W. Michael Blumenthal said.

Delivered just a few weeks shy of the company's second birthday, the 2200/600 series and its Extended Transaction Processing Architecture (XTPA) are the successors to the 1100/90 systems of Sperry Corp., which Burroughs Corp. bought to form Unisys.

At the time of its creation, Unisys outlined a grand plan that promised a complete renewal of the 1100 line; the firm began to deliver on those assurances when the 2200 line debuted last October.

Analysts praised the one-two punch of the new systems and XTPA — which multiplies transaction processing power by sharing database access and synchronizing work loads among several host machines — as a welcome addition that should bring much-needed power to the high end of the 1100 installed base.

Loading the basket

Clearly, Unisys is putting a lot of its eggs in the 2200/600 basket. "Considering the pent-up demand for this product, we're expecting substantial revenue from this," said Blumenthal, who also confessed that while European business has been good, U.S. business has been "spotty."

The air-cooled 2200/600 series makes installation and servicing less expensive and is also bound to be attractive to users, particularly those upgrading from the liquid-cooled 1100/90 series, analysts said.

Analysts said the processors are a needed boost for Unisys. "The top of their line has been late in arriving, and customers were running out of patience and looking at other options," said Omri Serlin, president of Itom International Co., a market research and consulting firm in Los Altos, Calif.

Unisys, however, denied that delivery has been tardy. "The life cycle of these systems has traditionally been three or four years," a spokesman claimed. "With the 1100/90 being introduced in 1984, we're right at the end of that cycle."

But Unisys may have more trouble than convincing customers that the delivery of the system is on time. Several users contacted by *Computerworld* said they are pulling the plug on their Unisys systems because software options offered by other vendors are more attractive.

"We're going to be dropping our 1100/60 for a DEC or IBM system for the simple reason that they offer a better communications package and third-party software availability is greater," said Gerald Matthews, director of computer services at Mississippi State University.

Other observers said the delay in the delivery of the 2200/400 could send a damaging ripple through the Unisys market. "With IBM controlling the high end of the transaction processing market, these lower end systems are where Unisys can really snap up new customers," said Laura Lederman, an analyst at Duff & Phelps, Inc., a market research firm in Chicago. "They can get their foot in the door with users who may eventually upgrade to the more powerful systems."

Potential users, however, said the delay will cause little, if any, inconvenience.

"It's just a bump in the road," said Bob Hearon, director of data processing at Hayes International Corp. in Birmingham, Ala. "We're just beginning to feel the need for more processing, and we'll eventually be upgrading to the 2200/400. But we weren't quite ready to do it yet."

Floral Network, Inc. (FNI) in Downers Grove, Ill., is anticipating a total upgrade for its four 1100/70 processors by 1990. While the 2200/600's announcement will not change a planned upgrade to 2200/400s for FNI, the company may move to the 600 as a future option, said Bob Poirier, director of FNI operations.

In a dual-processor configuration, Unisys claimed, the 2200/600 series can meet an industry-standard benchmark of handling 1,000 transaction/sec. The company, however, did not hire an outside auditor to validate the results, a spokesman said.

Prices for the 2200/600 series range from $2 million for the entry-level single-processor system to $8 million for the top-of-the-line systems with four instruction processors, four I/O processors and a four-way partitioning feature.

For extended processing capacity, the 2200/600 XTC pricing ranges from $8 million for two closely coupled dual-processor systems to $28.9 million for the maximum configuration.

Single- and dual-processor systems are slated to be available in March 1989, while three- and four-processor models will be available in June 1989.

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Unisys 2200/600 models are aimed at giving customers breathing room at the high end

Base model	Price	Availability	Storage (millions of words)	MIPS*
611	$2M	March 1989	8	15
622	$4M	March '89	16	29.25
633	$5.6M	June '89	16	42
644	$7.3M	June '89	16	55.5

* CW estimates

CW CHART

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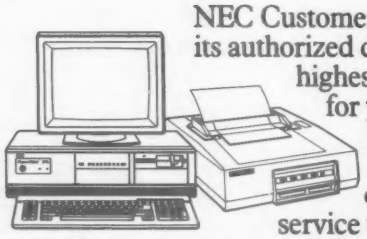

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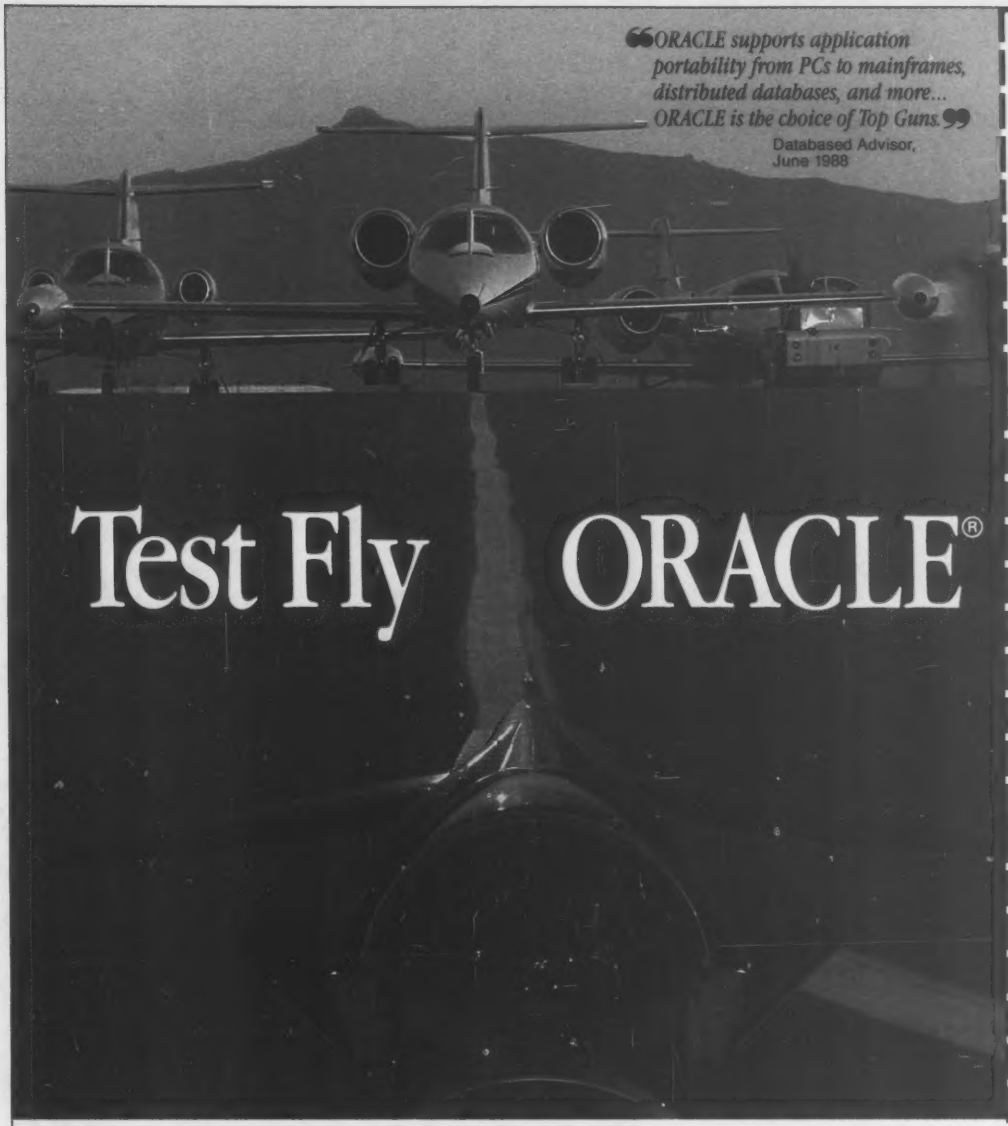

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Trade bill hits Toshiba laptops

Government ban is in retaliation for sales to the Soviet Union

BY MICHAEL ALEXANDER
CW STAFF

When a Toshiba Corp. subsidiary sold submarine propeller technology to the Soviet Union last year, little did it realize that the deal would torpedo another subsidiary's sales of laptops to the U.S. government. But that is what happened, thanks to a provision in the omnibus trade bill recently signed into law by President Reagan.

The trade bill prohibits Toshiba from selling its products to the U.S. government for three years. The ban is in retaliation for the sale of sophisticated computer-controlled milling technology by Toshiba Machine Co. to the Soviet Union. The equipment, already in use by the U.S. Navy's submarine fleet, can be used to reduce submarine propeller noise.

While Toshiba America, Inc., the U.S. marketing arm of Toshiba Corp., is exempt from the ban, that subsidiary can no longer sell its highly popular line of laptops to the U.S. government because the laptops are largely made with parts manufactured by Toshiba Corp.

The decision is likely to cost Toshiba America several millions of dollars, analysts said. According to Dataquest, Inc., a West Coast market research firm, Toshiba America had a 22% share of the estimated 405,200 laptops sold in the U.S. in 1987. The firm calculated that Toshiba is the second largest supplier, after Zenith Data Systems, in the entire commercial and government laptop market. Toshiba would not say just how much of that business came from the U.S. government.

Dark cloud

Grid Systems Corp., another major player that was recently acquired by Tandy Corp., estimated that it sold some $27 million worth of laptops to the U.S. government last year — about 40% of its total sales. Dataquest said Grid was the third largest maker of laptop computers in units sold last year.

"We were extraordinarily successful with the laptops. But after the propeller incident, it put a dark cloud over the business," said a former Toshiba America marketing executive, who declined to be identified.

"People were really incensed with Toshiba, and even if Congress had not done anything, their sales probably would have suffered," said Eric Kesler, an analyst at Information Systems Strategy Group in Vienna, Va.

Zenith, which was supplying $100 million in laptops to the military prior to the ban, and Sharp Corp. stand to gain the most from the ban, according to Kesler.

When the market's second largest competitor is knocked out of the business, it can only be better for the market leader, said Tom Buchsbaum, vice-president of the federal systems group at Zenith Data Systems.

"Without a doubt, Zenith is in one of the best positions to gain from the Toshiba ban," agreed Tom Young, a consultant at Computer Intelligence in La Jolla, Calif. "If you look at their shipments in the past year, they have outsold everybody by a wide margin."

Laptops made by Grid could also do well if the company delivers the much-respected, though pricey, laptops at a competitive price, Kesler added.

Grid is one of the few companies, in addition to Toshiba, making laptops with glare-proof gas-plasma screens, said Kirk Cruikshank, director of federal sales at Grid. "If a buyer has it in his head that he wants a gas-plasma screen, he'll come to us," he said.

Ogivar Technologies, Inc., a microcomputer maker based in St. Laurent, Que., calculated that its sales of the Ogivar 286 — an IBM Personal Computer AT-compatible laptop — to the U.S. government will increase by 30% to some 20,000 units, said Louis Belmont, vice-president of international sales.

"We originally wanted to sell 15,000 units, about 10% of Toshiba's market share," he said in a recent interview.

Toshiba America built an assembly plant in Irvine, Calif., during the summer of 1987 and is currently making laptops, among other things. The company is accelerating its plan to achieve a "high American content" in its laptops, a goal planned from the beginning, a Toshiba America spokesman said.

Whether putting more American-made parts into its laptops will enable Toshiba America to start selling them again to the U.S. government remains unclear.

According to the bill's provisions, Toshiba Corp.'s products must be "substantially transformed in manufacturing" before they can be purchased by federal buyers.

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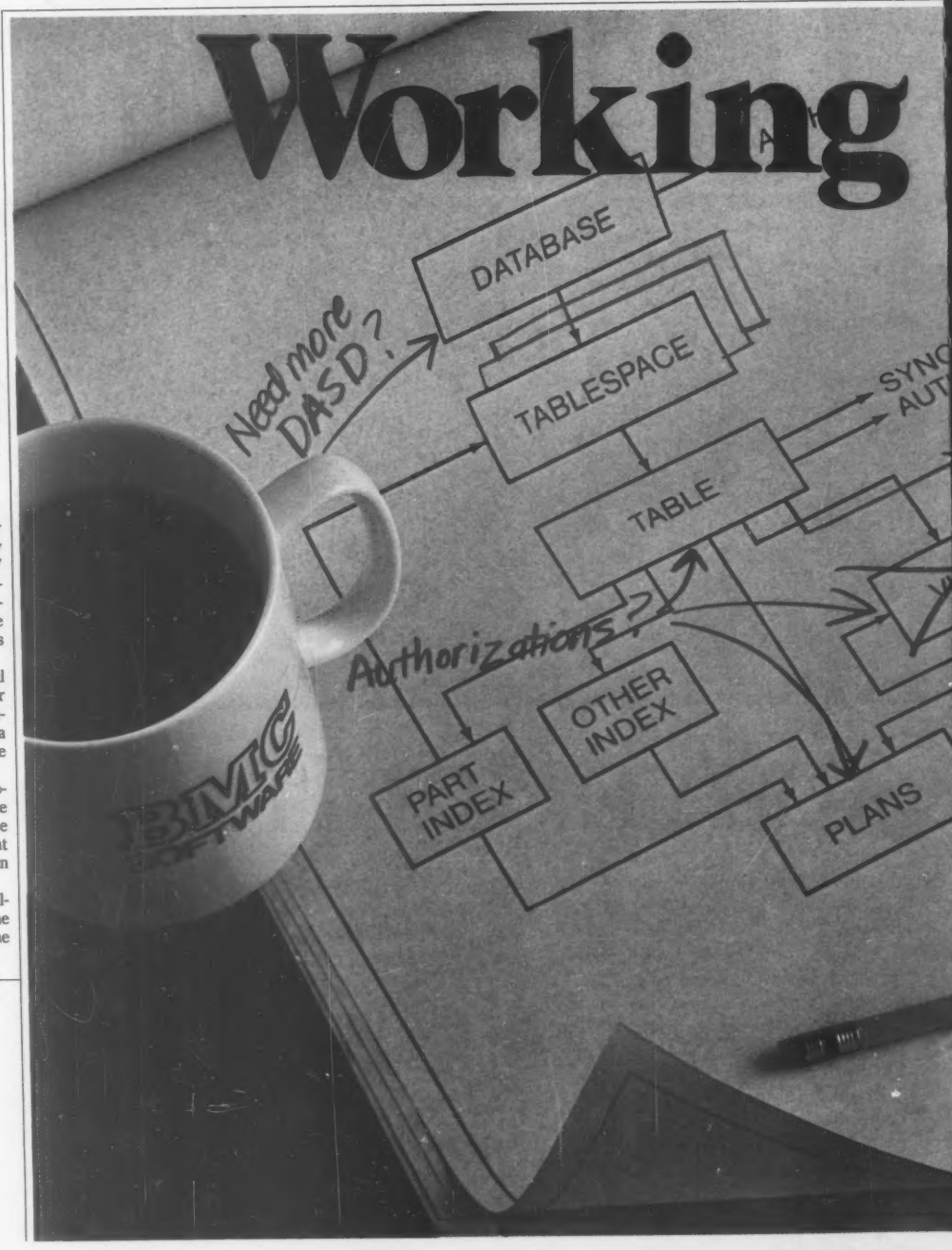

Black group eyes growth

BY JEAN S. BOZMAN
CW STAFF

CHICAGO — The 10-year-old Black Data Processing Associates (BDPA) professional society is negotiating with the Institute for Certification of Computer Professionals (ICCP) to be recognized as a national data processing professional organization. Initial talks took place as the BDPA held its 10th annual convention here Sept. 15-18.

If the talks are successful, said George Eggert, executive director of the Association of the ICCP, the BDPA will join the ranks of other ICCP professional societies, such as the Data Processing Management Association (DPMA), the Association for Information Management and the Association for Computing Machinery.

BDPA membership would not prevent black DP professionals from joining other groups, explained incoming BDPA President Vivian Wilson, manager of Ohio Bell's Information Systems Organization. "Some people already have dual membership in BDPA and DPMA," Wilson said.

After 10 years, the BDPA is intent on expanding its 3,000-person membership and on reorganizing to gain strength. At this year's convention, only 350 members attended. "We need to establish a national presence and a national agenda," said Michael McCrimmon, a Federal Express Corp. technical adviser recently elected BDPA vice-president. "If we were to affiliate with the ICCP, it would be a crucial step toward gaining recognition and support."

IBM's Crawford

The BDPA's relatively small size and modest budget have slowed the growth of the organization, BDPA officers said. To accelerate growth, the group is reorganizing its 27 chapters along regional lines and stepping up the pace of meetings.

Officials said the BDPA hopes its reorganization will help it have an impact on federally funded educational programs and on Fortune 500 corporations' hiring policies. "There is a new generation of black DPers coming through the ranks who find it important to align themselves with BDPA," said outgoing BDPA President Gerard Anderson, a systems engineer at IBM's National Marketing Division. "Members would like to reach back though the system and pull young people through, so they can get where we are today."

BDPA chapters are "adopting" elementary schools and providing computer classes to black students in low-income neighborhoods. Another expression of the BDPA's focus on youth is its annual National Computer Competition.

This year's third competition tested six teams from New York, Chicago, Cleveland, Washington, D.C., Memphis and Philadelphia. The winning New York teammates had to solve tough business problems on an IBM Personal Computer during a two-day period.

> "WE NEED to establish a national presence and a national agenda."
>
> MICHAEL MCCRIMMON
> BDPA

While the students noted positive feelings about computers, they indicated that they know the pitfalls of pursuing a DP career. "I'm the type of person who is trying to maintain my goals in life," wrote Eduardo Tweed, of the New York team. "But I always have to avoid obstacles in life like peer pressure, drugs and guns. All these things I face in my neighborhood."

BDPA keynoter Curtis J. Crawford, an IBM executive recently named vice-president of marketing in IBM's $6 billion National Distribution Division, acknowledged the important role of sponsorship to a large organization such as IBM. He emphasized the importance of having someone who believes in you. "I've been fortunate to work for a number of very, very strong managers who were willing to give me a chance — willing to believe in me and to give me the opportunity to demonstrate what I can do."

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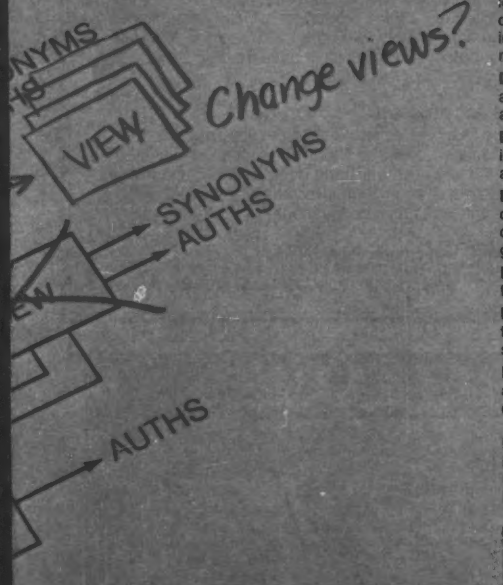

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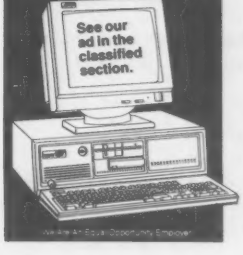

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TCA focus on Netview/PC

Conference to feature products for OS/2-based version

BY ELIZABETH HORWITT
and KATHY CHIN LEONG
CW STAFF

SAN DIEGO — IBM's revamped Netview/PC will be the major rallying point at the Tele-Communications Association (TCA) '88 conference, with several vendors exhibiting or promising products to support the IBM OS/2-based interface to Netview.

However, several of the offering's staunchest backers have announced their intention to support Digital Equipment Corp.'s recently announced Enterprise Management Architecture as well. A third contender, AT&T's Unified Network Management Architecture, will also be on display at the conference.

Five vendors — Stratacom, Inc., Tymnet, Inc., Bytex Corp., Telwatch, Inc. and Ungermann-Bass, Inc. — will demonstrate their products by sending network management information to Netview via the OS/2-based version of Netview/PC, which IBM announced last week.

Best of both worlds

Stratacom will be in both camps at TCA, demonstrating its ability to interface with the Netview/PC and Enterprise Management Architecture.

UB's network management system will use the OS/2-based interface to forward alarms and statistics from the vendor's local-area networks to Netview, while a Netview operator will send commands to UB's system. OS/2's multitasking feature allows the new Netview interface to simultaneously collect network statistics, handle real-time alarms and perform other functions, UB spokesman Antoine Gaessler said. UB's support for OS/2-based Netview/PC will be available shortly after IBM makes the interface commercially available, he said.

Another fence-straddler is Digital Communications Associates, Inc. (DCA), which will formally announce and demonstrate its Open Network Management System (ONMS) at TCA. Based on a Sun Microsystems, Inc. workstation product that currently manages DCA's T1 switches, the system will use International Standards Organization Open Systems Interconnect (OSI) protocols to collect data from DCA's other networking products, according to senior product manager Marty Grubin.

ONMS will also communicate with DEC's Enterprise Management Architecture, other OSI-compliant network management systems and IBM's PC-DOS and OS/2-based Netview/PC offerings, Grubin said. Scheduled for availability in the first quarter of next year, the product will cost between $42,000 and $100,000, depending on configuration.

Other TCA introductions will support the current PC-DOS-based Netview/PC. These include a new alert management control system from Data Switch Corp. in Shelton, Conn., and a Sun workstation-based system that DSC Communications Corp. has developed to manage its own multiplexer and cross-connect product families.

Network Equipment Technologies Corp. (NET), in conjunction with IBM, will demonstrate the new IBM Transmission Network Manager, a graphics-based network management tool that allows Netview to manage NET Integrated Digital Network Exchange multiplexers.

Network management has been a hot button for users during the last three years and remains a dominant theme at trade shows.

"Users are finding that the problem of network management is still not solved," said Clare Fleig, an analyst at International Technology Group in Los Altos, Calif. "It's a complex problem that needs to be solved in a series of steps."

NEC America, Inc. in San Jose, Calif., will introduce NCMS/PC 386, a network management system that purports to monitor voice and data lines, modems, multiplexers and DEC VT100-compatible devices. The color graphics-based system uses a NEC Powermate 386 PC as the hardware foundation and includes its own Netview interface, saving the user from having to purchase Netview/PC, a NEC spokesman said. Priced from $16,000 to $49,000, it is slated for December availability.

Dynatech Data Systems in Newington, Va., will announce Prism, a network management system that will incorporate IBM and Microsoft Corp.'s OS/2 Presentation Manager and will be available a few months after Microsoft releases the code, the company said. The Presentation Manager is slated to ship next month.

The product will also support both current and OS/2 versions of Netview/PC. Pricing will be set at approximately $5,000 per type of network device. It will eventually manage all of Dynatech's networking products, including matrix, CCITT X.25 and channel switches.

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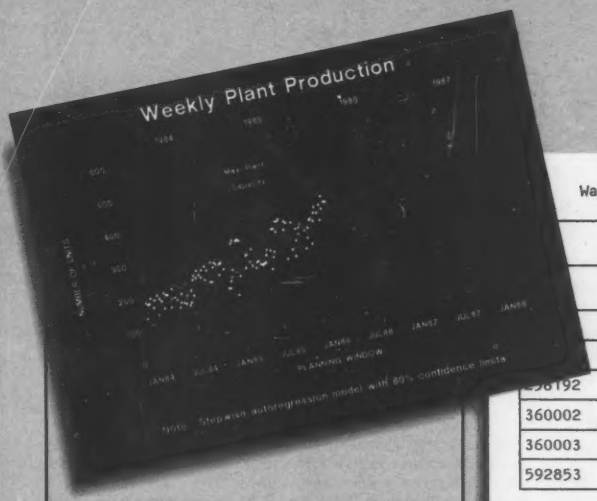

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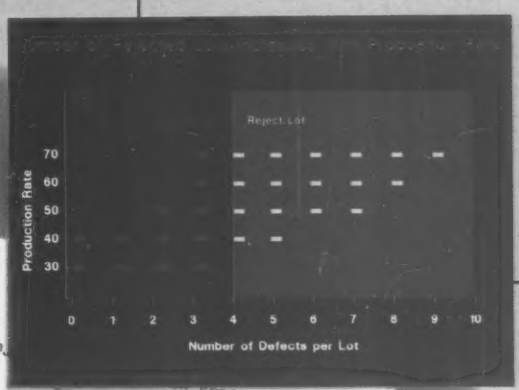

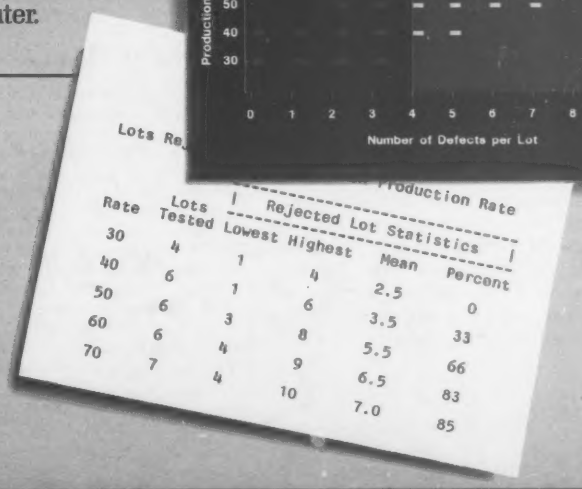

* Computer Intelligence, January 1986.

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EDITORIAL

Now get even

LAST WEEK IN this space, we exhorted readers to get mad at the personal computer vendors' shenanigans that have thrown so much fear, uncertainty and doubt into the marketplace with seemingly little regard for the needs of their customers.

The problem wouldn't be so bad if it were only one segment of the market in which the vendor dramatics were being played out. But the fact is that these antics permeate many segments, always with the resultant FUD factor hanging gloomily over disorderly markets.

The Unix wars are a case in point. With that operating system's greatest allure being portability of applications across various hardware platforms, the vendors have been listening to a uniform, consistent plea from users for greater standardization in Unix development. Instead, we get a Unix shoot-out with the Open Systems Foundation in one trench, the AT&T-Sun alliance in the other, and the users crouched in foxholes in no-man's-land waiting for an armistice.

Or consider the factory network topology struggles. On the one hand, we've seen a grassroots effort led by very large customers that fostered a set of protocols lumped under the Manufacturing Automation Protocol, or MAP, moniker. At one point last year, a down-and-dirty street fight broke out between the MAP people and DEC, ending only in an uneasy ceasefire.

The list of internecine wars goes on, and it makes a mockery of the vendors' pronouncements of being customer-driven.

We are not so naive as to ignore the realities of doing business in America. Clearly it was *not* in DEC's immediate interests to hop on the MAP bandwagon when the company has invested so heavily and successfully in Ethernet. Similarly, it *was* clearly in IBM's interests to muster its prodigious research-and-development might to produce a one-of-a-kind bus architecture in an attempt to reassert dominance in the PC market.

But through all the smoke of battle, there is an ironic factor that remains undeniable: The customers essentially control the supply lines, at least the customers acting in the aggregate and guided by the Adam Smith-like "invisible hand."

Take the case of the Micro Channel Architecture. Hailed by IBM as the basis of the second coming of personal computing, the customer base has instead shown a greater appetite for the AT technology that IBM tried to kill. In shunning the hype and doing what's best for them, the users shifted market share to the clone makers, forced IBM to reintroduce the AT and provoked a major shake-up within IBM. That's power. That's getting even.

There is no escaping the fact that these wars and other new ones will continue, generally to the customers' short-term detriment. But as the stakes for the vendors get higher in an emerging world of enhanced standardization, the penalties for not acceding to the real driving force in the marketplace will become more severe.

LETTERS TO THE EDITOR

A real advantage

It was interesting to read John Barnes' Viewpoint on the document-first strategy [CW, July 25]. This strategy was successfully tried and implemented on a project I worked on in 1981.

In a situation in which the system goals were not specifically defined, in which the system developers were novices and in which obtaining concurrence from the customer on system functionality was crucial, our strategy to develop a users' manual before doing anything else worked to a great advantage.

The project was described in an article published in *MIS Quarterly* ("An Approach to Structured MIS Development," Vol. 5, No. 4, December 1981). The current crop of computer-aided software engineering tools will certainly help implement this approach and at the same time ensure quality assurance during the entire software development life cycle.

Ashok Shenolikar
Systems Architect
Grumman Data Systems
Woodbury, N.Y.

Do as we say . . .

Last year, IBM's ads showed two worried clients, one from a small business and one from a large one. Each was asking IBM, "Can you help me?" IBM answered "yes," explaining that it was impossible for "one architecture to serve each equally well." It pointed up the advantages of having a choice between the incompatible System/36 and 38 and the 370, adding, "You may even want both."

This year, Alan Alda is watering his AS/400 and watching it grow, handling all his business needs no matter what size they become. According to IBM, "It does what growing companies have told us they want." And it "comes from IBM's leadership, with over a quarter-million midsize computer systems in place."

If they followed IBM's previous advice, what do those "growing customers" who "told IBM what they want" have right now? A quarter of a million IBM systems with mixed, incompatible architectures.

What does IBM say about the concept of a single architecture that works well across a wide spectrum of applications? Yesterday it said nobody had it; today it claims that IBM makes it work.

Customers confused by IBM doublethink should find out what the rest of the industry has been saying.

Daniel P. B. Smith
Norwood, Mass.

Who's to blame?

Your recent piece, "Could high-tech have beaten stress?" [CW, Aug. 8] takes leave of all reason in an attempt to blame the Pentagon's procurement practices for the Iranian airliner disaster in the Persian Gulf.

The horrors of that battle have been described endlessly in the media, and the overwhelming consensus is that the *U.S.S. Vincennes* and its crew acted appropriately in a terrible situation. But you decided that the situation "may" have come out differently if "the on-board computer" had somehow been "geared for processing" battleground data. Curiously, you offer no free advice to the idiots who sent an airliner full of civilians directly into a battlefield, nor do you criticize those who attacked the *Vincennes* and thereby created the battlefield in the first place.

These are bland generalities of the sort that can sell a political point of view in *Time* or *Newsweek*. If *Computerworld* also wants to ride on the anti-Department of Defense bandwagon, it will have to do better than this incredible stretch.

Jeff Pittman
Systems Supervisor
Waccamaw Corp.
Myrtle Beach, S.C.

They do care

A recent article stated that On-Line Software International, Inc. "has been placing less emphasis on its RAMIS fourth-generation language product" [CW, Aug. 15]. The restructuring of our direct sales organization does not in any way signify a lessening of our commitment to any of our products, including RAMIS. Our commitment to supporting and enhancing RAMIS is as strong now as it was when we acquired the product nearly two years ago.

On-Line is firmly committed to supporting and enhancing the RAMIS product line and maintaining the software investment made by its user community.

John Crocker
Senior Vice-President
On-Line Software International, Inc.
Fort Lee, N.J.

Computerworld *welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor,* Computerworld, *P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.*

How to grab an exec's attention

Provide an information system that's tailor-made and user-seductive

JERROLD EISEN

Hardware and software manufacturers are beginning to tout "executive information systems" as a major new market niche.

Vendors are not interested in this market because of potential high unit sales. The top 5% of the executive pyramid does not buy many workstations directly.

The attraction for vendors is the opportunity to control accounts. Systems that feed information to the executive information system over time become compatible with it, not the other way around.

Another important factor is the lack of price sensitivity. Executives frequently justify a purchase with no more than the statement, "I like this. Get it."

Many installations, unfortunately, miss the mark in using these products. Executive information systems focus on numbers and admittedly do a decent job of delivering numbers and graphic representations in a variety of aesthetic and accessible formats.

However, looking at numbers occupies less than 5% of the typical executive's time. Even without an executive information system, the critical numbers should be sculpted through the years down to a level of detail that the executive has personally determined to be meaningful and to a format that he finds comfortable.

From a data viewpoint, executives are seen more as information touchers and movers than as analysts. They see and then they ask, "Why are travel expenses up?" "What caused the drop in the central-region sales?" "Get a task force started to recommend action to reduce absenteeism in the Chicago plant" and so on.

Decisions, decisions

Conventional wisdom says that numbers are the fodder of executives' lives. But using numbers to reach a decision is, in fact, only a first step. Once reached, decisions must be communicated, responsibilities defined, events tracked and results reported. A decision to scrap a product line, build a plant, add personnel or reorganize is just the beginning of a long chain of events that must be well supported in a thoughtfully designed executive information system.

In every review of the executive schedule, personal communications is, in fact, the dominant activity. Rather than being driven by the bottom line in their workday, most executives are ruled by calendar entries and unplanned interruptions.

Time management is the dominant issue. Executives — actually their secretaries — parcel out typical 12- to 14-hour workdays in 15-minute blocks. Most of those days are not spent alone reading reports but are spent face-to-face in office meetings, on the telephone and in a conference room.

Good executive information systems should not provide just decision support. The real value-added role of a good executive information system should be one of time management and team coordination. Meeting coordination, effective follow-up, easy scheduling, personal briefing books and other interpersonal aids should all be components of a first-class executive information system.

A system that allows for good delegation, whether to secretaries, aides or staff, will always be more useful than a system that assumes an executive will use the system personally. Some will, some won't.

So, aside from quantitative decision-support tools, what should be included in an executive information system?

- An easy-to-use and intuitive interface. Executives simply cannot afford to make large time investments in learning. To accomplish some tasks, there should be a minimum number of keystrokes, or none at all. A mouse or touch screen should be offered. For casual users, all operations should be easy to remember (or hard to forget).
- A solid electronic mail package that allows an executive to cut across internal organization lines when needed. An executive information system mail package must mimic the way executives and their secretaries work.
- A powerful tickler/to-do/follow-up package that ensures that once a decision is made or a responsibility is delegated, commitments are met and results tracked and reported.
- A scheduling — and, equally important, rescheduling — module that handles meeting coordination among the secretaries, reservation of facilities — even ordering coffee and bagels.
- A "who is it, why are we meeting and what do we have in common" module that can brief an executive while the guest is in the anteroom.
- The electronic briefing book concept, in which disparate bits and pieces of information can be brought together in an attractive, consistent and accessible format. Some of the information in the briefing book will be fairly static — like an almanac. A broad-coverage electronic briefing book — if you will, a combined internal *The Wall Street Journal* and *The World Almanac* — could include last month's financials and this month's personnel anniversaries, news flashes on competitive announcements and major customer earnings reports, minutes of the last planning meeting and drafts of the speeches planned for the quarterly financial analysts meeting. These types of information can form the cornerstone of a widely accepted and long-lived executive information system.

DAVID G. KLEIN

Therefore, when planning to install an executive information system — or bring one to market — make sure the product not only provides decision-support modules but also offers enhanced coordination tools and, most important, helps an organization's metabolism by enhancing personal communications.

If the system is truly attractive and user-seductive to the executive, he will want to "swivel the chair" to take advantage of this system.

Eisen is president of Office Sciences International, Inc., based in Iselin, N.J. His firm specializes in executive information systems and co-sponsored a national symposium on the topic in June.

Ma, forget the shower; let's install a mainframe

MICHAEL B. COHN

I have been a computer programmer for what seems like a lifetime. I know Cobol, RPG and assembler.

I can read dumps with my eyes closed. I have designed relational databases while waiting in cafeteria lines.

So what if my brother owns a tile store in the suburbs and makes twice as much as I do? I still consider myself very smart, even though he charged me retail for my master bath.

Why my mother had to do this, I don't know. I am a good son. I stop by the house every week. Change a light bulb. Fix a gutter.

But today was different. She was beaming as she opened the front door. Maybe she'd found solid white tuna on sale for half price.

"Guess what, Mr. High-Tech, look what I got on sale." The "on sale" must have been the key ingredient here, because there was no other way to explain the unboxed PC lying on its side on the kitchen table.

Why me?

"I know what you're thinking," she said, before I could even ask her why the keyboard was still stuffed under the celery and cabbage in a shopping bag. "But when the nice salesman heard that my son had a big-shot computer job downtown, he assured me that you could show me everything."

We had a problem here. This was the woman who once refused to buy an electric can opener because she didn't have any electric cans. The woman who had cooked microwave popcorn several times before realizing that you didn't open the bag until after you popped it. The same woman who, most recently, had massacred my VCR by repeatedly trying to record the cassette on side two.

But even worse, I couldn't tell her the truth. I wanted to calmly explain to her that I really don't know anything about PCs. I work on mainframes. I know a lot about large business systems. Compiled languages. On-line processing.

I didn't really plan to be PC illiterate. But somehow, amongst the time-sharing editors, conversational processors and big-buck boxes, the little computers had slipped right by. I was just a smart guy with a dumb workstation. It wasn't my fault.

But she just stood there, a mouse dangling from her hand, like a kid waiting to fly a kite. I had to try something. I spread all the pieces out on the kitchen table. The battle was on.

I think I could have pulled it off. After only a couple of hours, the machine was actually starting to make different noises, and no smoke was coming out of any of the parts.

But somewhere between pages 47 and 48 of the instruction manual, I heard the unmistakable sound of my brother's tile truck pulling into the driveway. Ma must have been cooking something.

At the sound of the slamming screen door, I tried to hide as much of the evidence and debris as I could. But my brother stopped on his way to the refrigerator and noticed the endless string of "Bad command or file name" messages on the screen.

"Hey, whiz kid, having some trouble? I thought you were supposed to be this big-time computer jock."

My family was hopelessly blind to the injustice that was taking place. I wasn't an idiot! I knew my stuff! I was a guru back at the office!

But they didn't understand architecture. Or operating systems. Or register usage. They only understood that this big-time computer programmer was chewing on the printer cord of this "little" computer.

Foiled again

"Move over, superstar," my brother said. "I just got one of these down at the store. Let's change drives, format a few disks, and then we'll try to set up a few subdirectories." Ma was most pleased. She made my brother a turkey sandwich.

Some day, I pray that Ma needs to write a menu-driven transaction processor that can accommodate both real-time updates and batch multifile queries. When she does, I'll sure show her.

But in the meantime, not only does she have a PC, but she is also considering a new shower floor.

Cohn is a quality assurance representative and user based in Atlanta.

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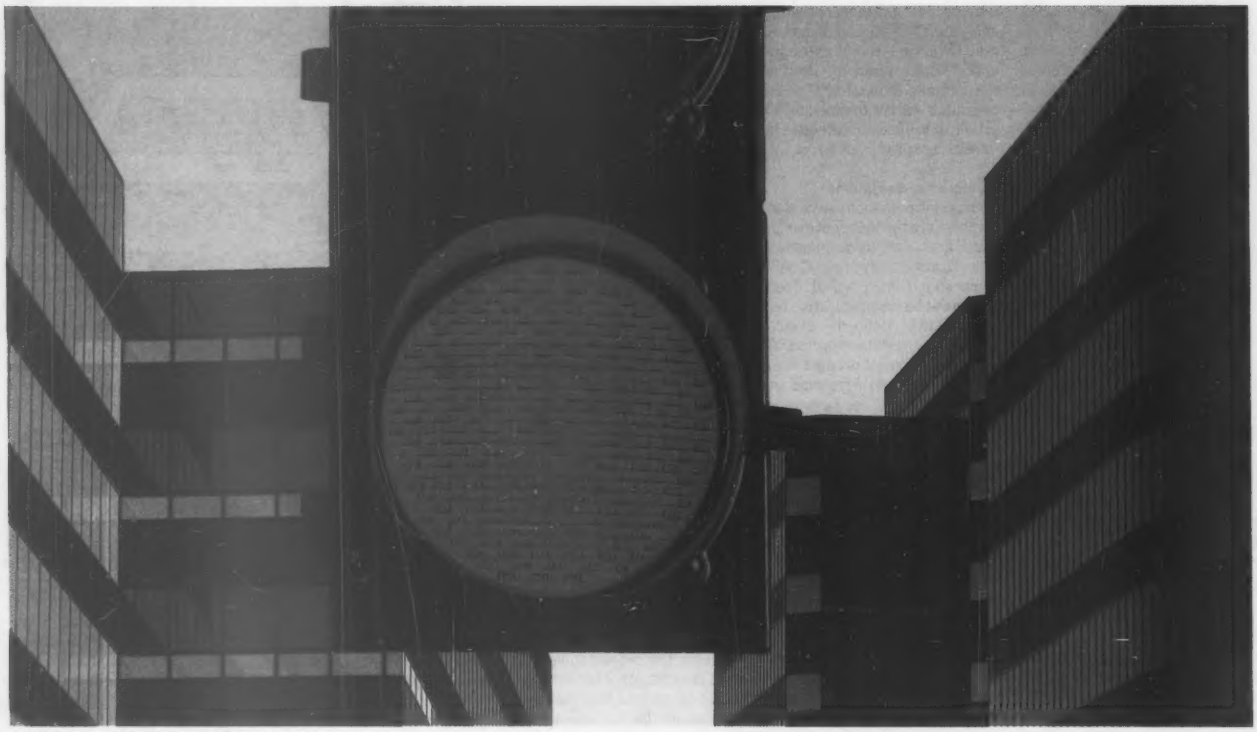

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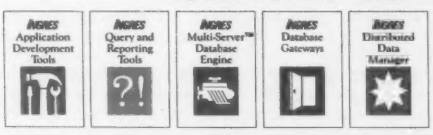

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SOFT TALK

Stanley Gibson

The illusion of openness

The squeamish ought not to watch either laws or sausage being made. Software, and particularly open software, should probably be added to those.

The eyes and ears of the press will be shielded from the upcoming membership meeting of the Open Software Foundation. And a good thing it is.

There is no telling what the press might think if it were to observe people in free and open discussion. (Lest I be taken as an ingrate, I should note that the press has been invited to a reception and press conference, at which the results of the meeting will be described — either fully, minimally or altogether obscured.)

Thus, the OSF is open, but not to the public — only to those who pay the membership fee. After the meeting, the public will be told what was decided by members, much as a court of law is read a verdict by a jury.

Of course, where the OSF is concerned, this won't be the first time there will be agreements reached behind closed doors. The very formation of the OSF was based on that. And although

Continued on page 30

Controversy rewinds over tape

Sun Exploration says defects led to data errors; BASF denies accusation

BY ROSEMARY HAMILTON
CW STAFF

A representative of the Sun Exploration and Production Co. in Dallas said last week he believes BASF Corp. has produced more defective tape cartridges than the one batch the firm has acknowledged. He added that Sun may bring a lawsuit against BASF if it cannot reach an agreement to replace 40,000 cartridges.

Sun encountered an increased rate of errors while transferring data to tape earlier this year and believes defective BASF cartridges are the cause. BASF produces products that are compatible with IBM 3480 tape drives.

BASF claimed that Sun has not proved that BASF products are the source of the increased rate of errors. Furthermore, a BASF representative said Sun's opinion that there are more defective tapes than BASF has acknowledged does not have supporting facts to back it up.

Resting its case

Sun claimed it has provided all the evidence BASF needs to conclude that its products caused the poor system performance. Sun has more than 100,000 cartridges installed from various tape cartridge vendors.

Sun further asserted that BASF's request for additional reports and data are an attempt to avoid replacing the tapes.

Since March, Sun said, it has removed thousands of BASF cartridges and has documented a drastic improvement in system performance. From that documentation, Sun concluded it was the BASF products that caused the poor performance experienced this year, according to James Myers, Sun's manager of hardware and data storage.

Last week, Myers said BASF director of marketing John Healion started talking with Sun about the problem. "He's been a brick wall until now," Myers said.

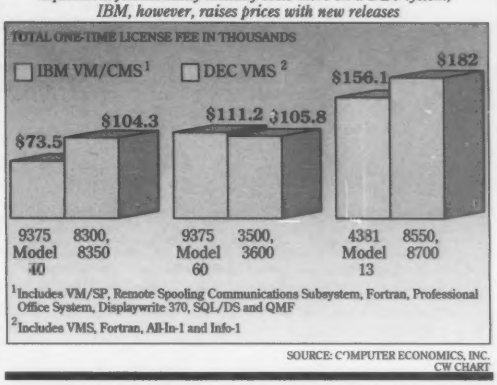
"We are in discussion, no

Continued on page 25

Data View

DEC vs. IBM software

Equivalent functionality initially costs more on a DEC system; IBM, however, raises prices with new releases



[1]Includes VM/SP, Remote Spooling Communications Subsystem, Fortran, Professional Office System, Displaywrite 370, SQL/DS and QMF

[2]Includes VMS, Fortran, All-In-1 and Info-1

SOURCE: COMPUTER ECONOMICS, INC.
CW CHART

More disk, less size

BY ROSEMARY HAMILTON
CW STAFF

DETROIT — Unisys Corp. plans to offer a disk subsystem for its A 17 and V 500 series mainframes that is said to offer higher performance in a smaller package than currently available.

The 9399-H Dual String Controller is a follow-on product to the 9399-E model and can improve data transfer rates by 233%, according to company officials. The older model sent data

Continued on page 27

Curtain up on Cobol compiler

BY STANLEY GIBSON
CW STAFF

IBM recently introduced the mainframe Cobol 85 compiler that it had tested under wraps by the National Bureau of Standards last fall.

VS Cobol II Release 3, which supports the ANSI 1985 Cobol standard, also includes Systems Application Architecture (SAA) support across multiple operating system environments, IBM said.

Without formally announcing it, IBM previously offered that release to the federal government for certification [CW, Nov. 30 and Dec. 21, 1987]. The government agreed to keep the tests secret.

IBM also defined how CICS/VSE will operate in the SAA environment, without formally adding VSE or CICS/VSE to SAA.

"No new elements are included under SAA. We are telling

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Inside

- Will a DBMS benchmark committee cry if it wants to? Page 23.
- Point-of-sale processor merges store data. Page 23.
- Ardent spreads some graphics supercomputer wealth. Page 23.

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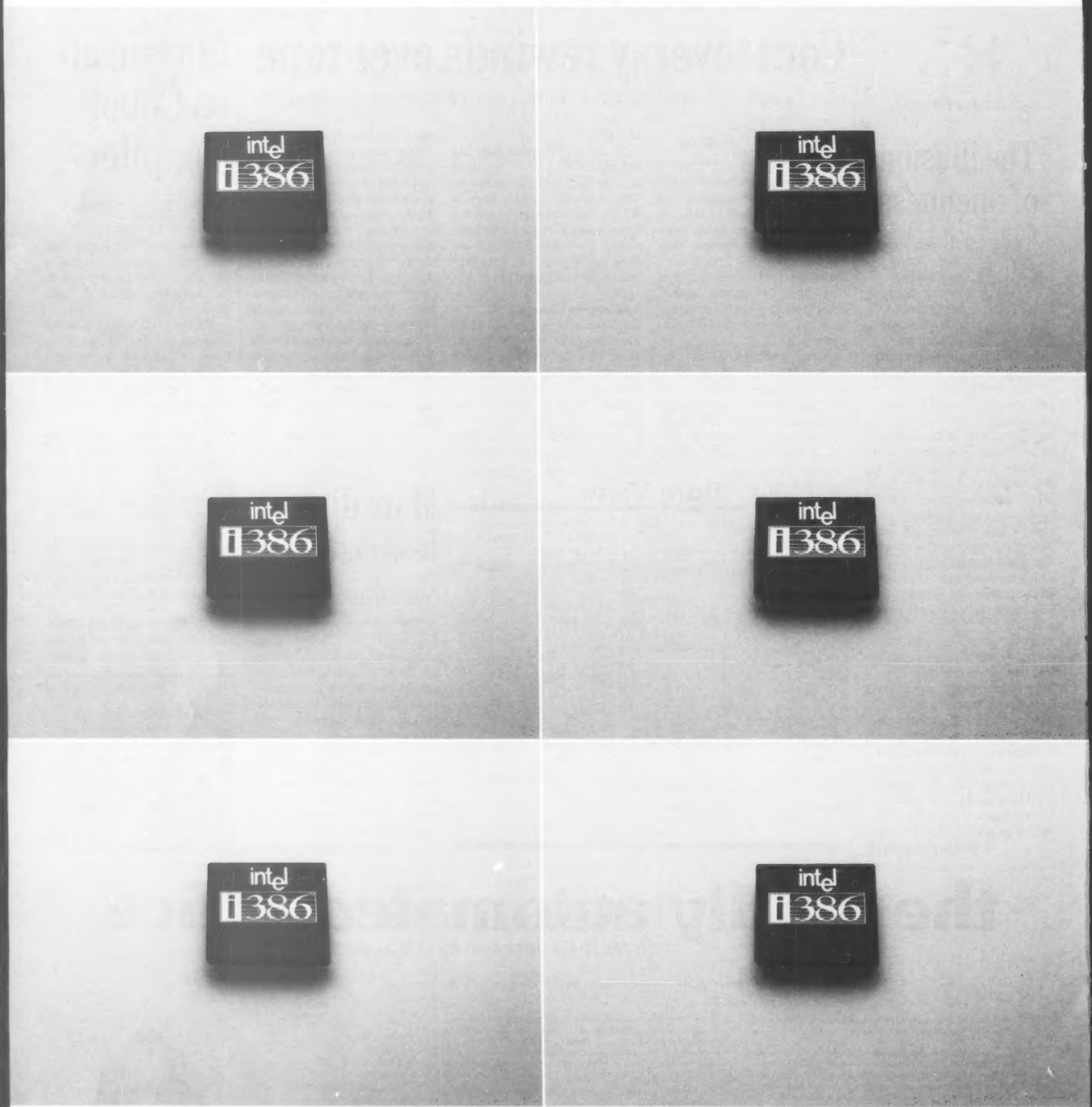

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HARD TALK

Rosemary Hamilton

Let the 9370 do the talking

One of the more interesting aspects of IBM's 9370 announcement earlier this month was that most folks either didn't expect those new models or didn't seem particularly taken with them.

This draws a sharp contrast to the Application System/400 rollout. IBM made a big deal about customer involvement with the AS/400's development. Users were trotted up to Rochester, Minn., to tell IBM what they did and didn't want in that system. It was a made-to-order mid-range computer.

Back in 370 land, the mid-range offering gets a big face-lift, and customers and analysts alike seem a bit puzzled. They were expecting low-end models or a razzle-dazzle high-end model that would bump into the 4381's power range. Instead, they get three models that line up between existing models.

Out of touch?

So what gives? Are IBM's 9370 developers out of touch and rolling out systems without respect to customers' needs?

Not at all, says Ed Kfoury, president of IBM's Systems Products Division. To understand the 9370 announcement, one must look beyond the products introduced. One must understand the statement IBM

Continued on page 32

NCR retail line gets an upgrade

BY JEAN S. BOZMAN
CW STAFF

DAYTON, Ohio — NCR Corp. has added a new level of departmental processing to its retail point-of-sale systems: an in-store processor that can consolidate store data before relaying it to a host NCR or IBM mainframe.

The NCR 2127 point-of-sale terminal, announced earlier this month, is an enhanced version of the NCR 2126. About 140,000 2126 point-of-sale units have been installed worldwide since that terminal was announced in 1982.

The 2127 offers advanced keyboard features, but it also becomes an integral part of a store's data processing system when attached to an NCR Tower minicomputer. A relational database called Ultra, based on an Oracle Corp. database management system, provides in-store sales analysis, NCR said. Beyond that, the Tower's communications software interface allows the central mainframe to gain a single, logical view of the remote store site, NCR said.

The system allows host computers to extract data without disrupting sales transactions. "We can go into a file and access the fields we want," explained Leo Harty, assistant vice-president of NCR's Food and Drug Systems division. "Stores can update their central database during the day and won't have to wait for overnight batch updates."

Custom consolidation

MIS programmers can use Ultra to write custom applications that consolidate or analyze a store's data on-site, according to product manager Martin Gunning. "That will allow stores to review daily sales in a pharmacy department or at the checkout scanners," Gunning said. Other applications handle employee attendance and administrative tasks.

The $90,000 2127 system, slated to be available next month, includes a Tower 32/400, 12 2127 terminals, the Ultra software and a copy of the Oracle DBMS. NCR is including a tool kit of software util-

Continued on page 30

HARD BITS

Titans installed at five shops

Ardent Computer Corp. said it delivered six of its graphics supercomputers to five customers recently. Titan recipients are United Technologies Research Center in Stamford, Conn.; the Department of Molecular Biology at Scripps Clinic in La Jolla, Calif.; Princeton University's Mechanical and Aerospace Engineering Department; Biodesign, Inc. in Pasadena, Calif.; and Landmark Graphics in Houston. The orders brought in $800,000 to Ardent, the company said.

The International Stock Exchange, formerly known as the London Stock Exchange, recently made a $2 million commitment to **Stratus Computer, Inc.** in Marlboro, Mass. The stock exchange plans to purchase several Stratus XA2000 systems — fault-tolerant computers de-

Continued on page 27

DBMS vendors shy away from open test

BY AMY CORTESE
CW STAFF

What if you threw a party and no one came? The Unix Expo Database Performance Review committee is hoping it doesn't find out.

But so far, major database vendors are turning down the invitation to participate in the independently run public benchmark, which is intended to dispel some of the confusion concerning recent performance claims.

It is the committee's third year attempting a successful public test of Unix-based database management systems. In 1986, suspicion was cast upon the event when the briefcase containing the only copy of the test results was stolen before the results could be made public.

The following year, a series of mishaps — including a power outage and disks being accidentally written over by one participant — combined to slow down the process. Time ran out before all the tests, which took place on the floor during Unix Expo, were completed.

This year, Neal Nelson, chairman of the Database Performance Review committee and president of Neal Nelson & Associates, a Chicago-based benchmarking firm, hopes things will be different.

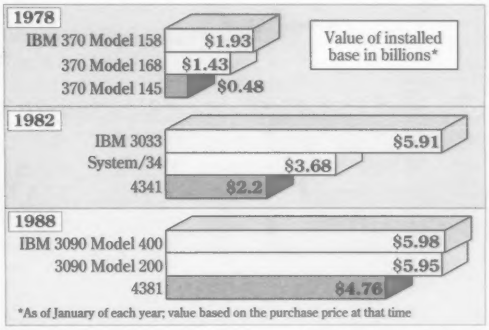
Steps have been taken to ensure an orderly process. All testing is to be done before the expo, with vendors given plenty of time to test their systems before the final test is completed by Nelson's firm.

Continued on page 32

Data View

The name stays the same

Only the models have changed as IBM again sweeps the top three positions among U.S. general-purpose systems by value of installed base



*As of January of each year; value based on the purchase price at that time

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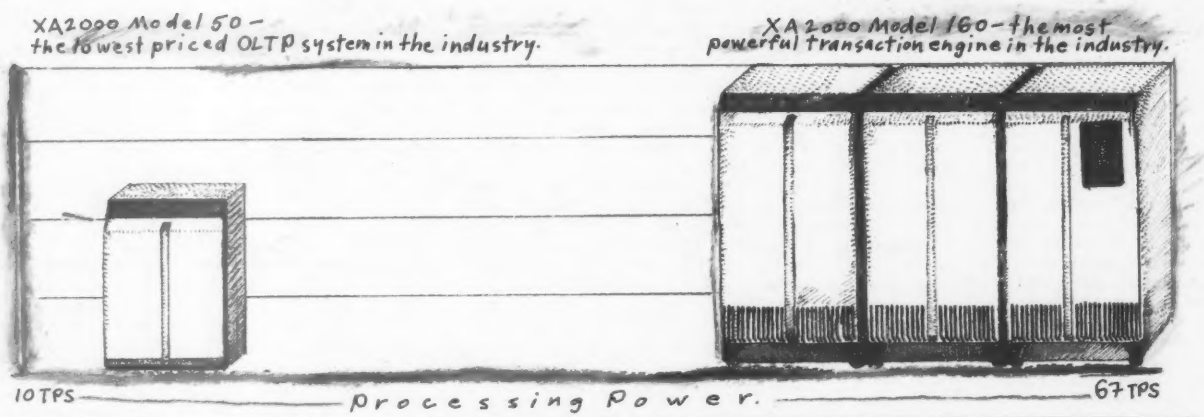

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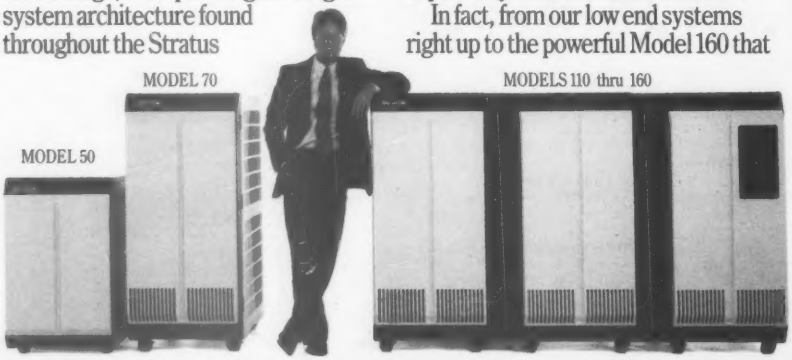

The XA2000 family of on-line transaction processing systems.

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Controversy

CONTINUED FROM PAGE 21

question," Healion said.

The standoff between BASF and Sun recalls similar problems reported by users earlier this year with BASF cartridges [CW, March 21].

In March, General Electric Co. spokesmen said the company had discovered a white powder on its cartridges. It determined that the powder was not resulting in any data loss, but it was causing a high number of errors when data was written to tape.

GE said it was satisfied with BASF's response to the problem. The two parties determined that defective BASF tapes were causing the trouble, and BASF agreed to replace 60,000 of them.

At that time, Healion said the problem was under control. The company had identified a bad batch of tapes — approximately 200,000 — and was in the process of contacting other customers who had purchased them.

Also at this time, Sun became aware of the troubles GE had experienced. The GE situation was similar to problems Sun was having with its cartridges, Myers said. Sun had also discovered the white powder but at that time had not tied it to the poor system performance, he noted.

Did they talk?

Myers said BASF did not contact Sun to alert it to the defective tapes. Sun claimed that it contacted BASF and that BASF representatives went to Sun's facility, took samples of white powder and reported back to Sun that the source of the powder was BASF tapes. But then the standoff began.

Healion said he was not certain that BASF representatives had analyzed samples from Sun or agreed that BASF tapes were defective.

Myers claimed that the issue of providing BASF with additional data and reports is not only preventing a compromise but could be avoiding the real issue. Myers said he suspects that there are more flawed tapes than the 200,000 that BASF has identified.

Myers said BASF had told his company that the lubricant, a basic component of the cartridge, was changed late last year. He said he believes that such a basic component of the product was changed because BASF realized its tape cartridges contained a defect.

Healion said the lubricant was changed, but not because of a flaw. The company substituted another lubricant with the same basic chemical formula, which means the basic components of the product were never altered, Healion said. As such, there is no fundamental defect to the product, he stated.

BASF has shipped more than 10 million cartridges worldwide. Healion asserted that a fundamental flaw would result in hundreds of users reporting problems, which has not been the case.

Healion reaffirmed the story he provided in March, which was that the problem was confined to a batch of 200,000 tapes. Because of that experience, BASF decided to change the lubricant to prevent it from happening again. He said the bad batch resulted from two factors: excessive lubricant and the exposure of several thousand cartridges to extreme cold on a loading dock at BASF's Willstaedt, West Germany, plant.

Magnetic printers find attraction

Technology, price/performance rivaling those of laser models

BY JAMES DALY
CW STAFF

The laser printer may soon be involved in a title fight to defend its role as lord of the nonimpact office-printer world.

According to a recent survey of European magnetographic-printer users, magnetic printer technology is fast creeping up on — and in many cases equals — laser technology in such areas as speed, reliability and output quality.

"Magnetography can no longer be considered an experimental technology," said Michael Zeis, vice-president of research at the Datek Information Services, which prepared the report.

Since magnetographic printers began appearing on dealers' shelves three years ago, their primary user base has remained in Europe where Groupe Bull, the sole developer and manufacturer of magnetographic printers, is located.

Open market

But a U.S. market is beginning to open up. Magnetographic printers can now meet IBM's de facto industry standard of 240 dot/in., while Bull Peripherals, the U.S. division of Bull Corp., has already installed more than 100 systems on these shores.

The report by the Waltham, Mass.-based firm also indicates that the printers are not only making strides in measuring up to the quality of laser printers, but they are also on the offensive on the price/performance front.

According to the study, 50% of the respondents said they purchased the printers for price-related reasons, and 76% of the respondents rated the magnetographic printer price as reasonable or low. Magnetographic printers now can be purchased for less than $100,000, which makes them a competitive alternative to high-speed printers offered by companies like Xerox Corp., IBM and Siemens AG.

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Hard bits

CONTINUED FROM PAGE 23

signed for on-line transaction processing applications. The systems will be used on the exchange's on-line service, which is called Topic. Currently, Topic has 8,000 users.

Artecon, Inc. in San Diego, a reseller of Sun Microsystems, Inc. workstations, landed a deal with the U.S. Department of Labor that it said will bring in $8 million. The contract requires Artecon to install and maintain the Sun-based systems as well as provide training and documentation. The Department of Labor will use the systems for its Employment Training Administration and Unemployment Insurance Service. Artecon will provide four systems, three of which will be based on Sun 68020 workstations and one of which will use the newer Sun Scalable Processor Architecture.

Laser Magnetic Storage International Co. in Colorado Springs said it intends to fund gallium arsenide laser technology research at the University of Colorado at Colorado Springs. The company will provide an undisclosed amount of funding for three years.

First National Bank and Trust Co. of the Treasure Coast, a subsidiary of the Seacoast Bank Corp. of Florida, signed on for an **NCR Corp.** 9800XP mainframe recently. The bank, headquartered in Stewart, Fla., will replace an existing NCR system. Combined with application and branch automation software, the deal is valued at $1.6 million. NCR said the bank intends to purchase an NCR Financial Tower system in mid-1989.

More disk

CONTINUED FROM PAGE 21

from the controller to the host at a rate of 3M byte/sec. The 9399-H will reportedly transmit data at 10M byte/sec.

The subsystem is based on the Intelligent Peripheral Interface standard and conforms to the ANSI and Federal Information Processing Standards specifications, spokesmen said.

According to the company, the disk subsystem was enhanced to perform several functions that other devices were designed to perform, thus eliminating the need for them. For instance, with the 9399-H, users no longer need a B9389 storage controller because the 9399-H provides storage management.

The elimination of devices also cuts back on floor space, the company said. Losing the storage controller alone gives users an additional six square feet, a company spokesman said.

The 9399-H will use the B9494-24 disk drives, originally manufactured by Burroughs Corp. Unisys had been offering these for the Burroughs mainframes. Earlier this year, it introduced a 9494-24 disk drive that would work with both Burroughs and Sperry hardware.

The 9399-H will be shipped with one 9494-24 disk drive for $175,000. An additional 9494-24 will cost $70,000.

The subsystem will be available for the A 17 in November, and delivery is scheduled for the V 500 series in mid-1989, the company said.

Curtain up

CONTINUED FROM PAGE 21

VSE users how to program their CICS applications so they can be in accordance with SAA interfaces and achieve SAA portability," an IBM spokesman said.

Users following the guidelines will be able to write CICS/VSE applications and thus will be able to participate in networks of SAA systems. "We are telling the user how to do it. If we were doing it, we would say it is included under SAA," the spokesman said.

IBM also announced the following products:

- The IBM C/370 Compiler and IBM C/370 Library, an SAA language product for the MVS and VM environments offering 31-bit addressing and full program reentry.
- VS Fortran Version 2 Release 4, offering improved vector performance in VS Fortran environments and extending VS Fortran support for the AIX operating system.
- A new release of VM/IS that eases installation, change management and unattended operations. In addition, the Remote System Programming Support Offering gives VM/IS customers telephone and on-line access to the VM/RSP Support Center, which provides assistance for technical and administrative needs.
- Enhancements to the VSE operating system that simplify customers' remote and unattended operations and use of the system in local-area networks.

In addition, IBM moved up the ship date for VM/SP Release 6 from December to October.

IBM increased by 5% the price of software running on processors in Groups 10 and 15, to which the 9370 Models 20, 30, 40, 50 and 60 belong. In June, IBM cut the software prices for Group 10 by an average of 25% and moved the 9370 Model 60 into group 15, effectively lowering the price of software up to 42% for that machine.

IBM also said some 400 application families, up from a previous total of 200, can run on the 9370. Previously, IBM expressed the total as 1,000 distinct applications.

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access information all across campus and even the national supercomputer facilities throughout the country. And because the network accommodates a multi-vendor environment, students are better prepared for the job market they're entering. All this requires consistent support. Digital is there when we need them."

"We work in partnership with Digital planning for our future. It's a team effort," concludes Raveché. "Their technological superiority helps us maintain ours." To get your competitive advantage now, write: Digital Equipment Corporation, 200 Baker Ave., West Concord, MA 01742. Or call your local Digital sales office.

digital™

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Gibson

FROM PAGE 21

it is established that the work of the OSF is based on IBM's AIX version of Unix, no one will acknowledge publicly that the reason this is so is because of a deal.

Nobody wants to say AIX was selected as a condition of getting IBM into OSF. Nobody wants to say AIX was chosen because of technical excellence, either. About the most I have been able to get out of OSF officials is that AIX was, well, left on the OSF's doorstep.

In fact, OSF obtained, or purchased, an AIX license for the privilege of using the software. Who decided this in the face of the plethora of worthy Unix versions on the market? You can't find anyone who'll say.

Speaking plainly, it looks awfully like a deal was made. And then the deal was made to agree that it was not a deal.

What the OSF is engaged in is not technology or business, although it has elements of both. What it is doing is politics.

But is that wrong? Perhaps not. Politics is a necessary part of life, and computing is part of life, so why not have politics in computing? The problem is that the OSF would have us think it is doing something other than politics.

The rhetoric of the OSF is that it exists for some higher purpose than the (at best) legitimate business interest or (at worst) scheming of a group of computer vendors. Rather than saying that the OSF is a group of hard-nosed computer vendors meeting to fill a common need, the rhetoric of the OSF seems lifted not only from the Constitution but from the Mayflower Compact, the letters of Jefferson and the Magna Carta.

Veto that shirt

Indeed, the OSF has printed up T-shirts that read, "The Open Software Foundation . . . with liberty and justice for all," no doubt in an effort to spur enthusiasm among early employees. But the notion of liberty and justice for all, lifted from the suddenly popular Pledge of Allegiance, is, when applied to the OSF, sacrilegious.

An idealistic OSF is, simply, an oxymoron. The OSF is a business consortium designed to produce a product to compete with one currently on the market — no more, no less. When OSF ceases to serve its masters — that is, its sponsors, those who have paid the steep membership fee — it will cease to exist as an institution.

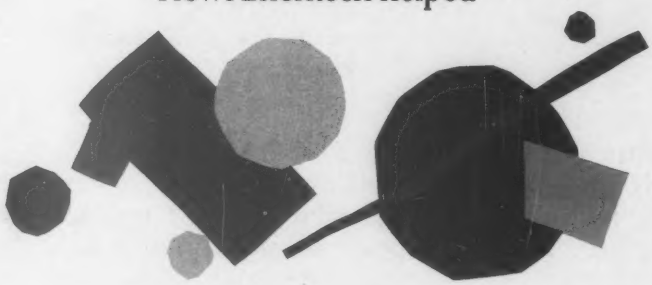
The members — those who have paid the lesser sum of $25,000 — will not be able to save it. At present, they are not guaranteed voting rights as members. Presumably they can discuss; the sponsors may listen. But they will cast no more than straw votes. The decision of the OSF leadership is final. Suddenly, "liberty and justice for all" doesn't sound quite right.

The OSF was created to offer a kind of freely licensed software under impartial control, which Unix came close to being until vendors perceived AT&T as treating Unix more like a property than a public trust.

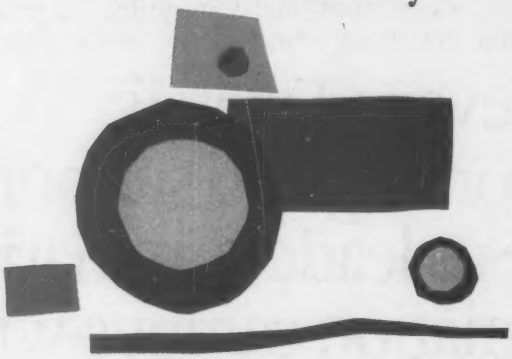
The final product of the OSF will almost certainly be freely licensed to all. But the making of that product is, despite a conscious effort to appear otherwise, not open at all.

Gibson is *Computerworld*'s senior editor, software.

How Ameritech helped



John Deere make hay.



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NCR

FROM PAGE 23

ities to allow custom programming. In the past, Harty said, customization was provided by third-party software firms or by NCR itself.

"We're providing customers with a tool set that allows them to program new applications in the C language on their personal computers," Harty said.

The target market for the 2127 system is the nation's major retailers and wholesalers, many of whom have an IBM mainframe as their central-site processor. Harty recognizes that IBM compatibility, which is supported by NCR, is a major factor in many customers' decisions to buy NCR terminals.

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The establishment of a truly open software environment will, without question, improve competition in the computer industry. Not eliminate it.

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The Open Software Foundation (OSF) was created for one simple reason: to develop an open software environment built on an open decision and development process. Open to debate. Open to ideas. And open to any company or institution, worldwide, who would like to participate.

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We're publishing RFTs. Requests for Technology to address each facet of the open environment. All are welcome to respond.

OSF members will, however, enjoy a key advantage. Participation in an open development and decision-making process.

From reviewing the submitted technologies to accessing code under development, OSF members will benefit directly. By taking advantage of emerging technologies and making informed decisions, such access to crucial information will enable members to bring new products to market faster. Now that's a competitive edge.

Open for business.

To all those who are concerned that the establishment of an open software environment will stifle competition, let us just say that nothing could be further from the truth.

By enabling vendors to focus on adding real value to their products, by giving members the critical advantage of getting to market faster and by providing an open process for the selection of the best technologies the industry has to offer, we, in fact, are letting competition do what it does best: make better products and provide better service.

We encourage you to take part.

If you respond to our RFTs, you can be assured they will be judged openly and fairly.

If you license our offerings, you will be guaranteed equitable and stable licensing terms.

And as a member, you can fully participate in the development of the open software environment.

Remember, these are business decisions that will affect us all.

As an industry, it is in our own best interest to ensure that the right decision is arrived at.

Be part of the process.

For more information about the Open Software Foundation, Inc. call or write us at 20 Ballard Way, Lawrence, MA 01843. (508) 683-6803.

Open Software

FOUNDATION

Hamilton

CONTINUED FROM PAGE 23

is making here, Kfoury says.

While Kfoury certainly acted like the proud papa of the new models, he also implied that they weren't what was really important here. What the 9370 rollout was really all about was commitment — commitment to a product line that has been kicked around by observers for nearly two years.

Acknowledging the 9370 criticism, Kfoury said, "When it was first announced, it was all things to all people, and unfortunately, now it's hard to read a positive word about it. I hope [this announcement] will convince the world we are committed to this product line."

Based on Kfoury's comments, the 9370 announcement was another move to position the mid-range systems as a strategic IBM product line.

Position pointers

Kfoury pointed out several things that show this positioning. The line now has the same name tag as the 3090s — and we all know how important they are. Both are known now as Enterprise Systems, indicating that the two lines make up a single family of systems. Of equal importance right now is the fact that the 4381s have no such name tag, which means that they are out when it comes to the strategic family.

Kfoury also noted that the new 9370s are based on CMOS technology, a first for a 370 product. Why would IBM make a technological investment like that in systems that weren't strategic for the future? Kfoury asks.

Kfoury does have the facts to back up his statement that IBM has again showed us how strategic these systems are.

The problem, however, is that IBM has been telling us how strategic the 9370 line is for nearly two years now. Haven't we reached the point where it's time to stop telling the industry how important the 9370 is and start showing us?

OK, but what else?

Statements of commitment, newer technology and new names are all well and good. But what about the low-end and higher end models that users have been asking for? What about pricing that will, as one analyst says, really shock the industry?

Kfoury would like us to believe that the 9370 announcement will soon be followed by even better things. The smaller and bigger 9370s that users have been expecting will soon be unveiled.

So we're waiting. IBM can tell the industry over and over again just how important the line is. But words alone don't make it so. Meeting users' needs means product sales, and that's what will give this product the importance IBM is talking about now.

Hamilton is *Computerworld*'s senior editor, systems.

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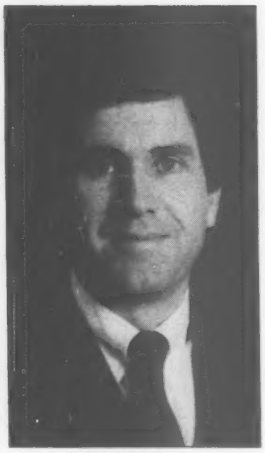

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The Hessinger Seminars for DB2 Users. Presented By ADR.

DBMS vendors

CONTINUED FROM PAGE 23

Invitations to participate were sent out in the spring to more than 15 vendors. However, when only two of the major Unix-based DBMS vendors accepted, the committee simplified the tests and made a last appeal. The 16-query test suite was reduced to a single order-entry transaction, to be reported as transactions per second.

So far, four vendors have accepted the latest invitation: Unify Corp., Concept Omega Corp., MDBS, Inc. and The Small Computer Co.

"If companies are bold enough to stand up and make claims, then they should be bold enough to put them to the test," asserts Ann Shukla, a spokeswoman for Unify.

Concept Omega is participating for the public exposure, according to company representative Keith Wimberly. The firm's product, Thoroughbred Idol-IV, is new, and Concept Omega feels the public needs to "get an idea of where we are in the market," he said.

One is enough

Rich Sheffer, spokesman for nonparticipant Sybase, Inc., said Sybase's absence is simply a matter of making choices and that the company has committed to the Transaction Processing Performance Council, a standards advocacy group. Rather than have a proliferation of many benchmarks, Sybase would rather have one benchmark as standardized as possible, according to Sheffer.

Major players in the Unix DBMS market Oracle Corp., Relational Technology, Inc. and Informix Software, Inc. could not be reached for comment.

Nelson pointed out that the Database Performance Review is happening now, while it is not likely that there will be any results coming from the Transaction Processing Performance Council for some time.

Under the terms of the Database Performance Review, three platforms will be used: a Compaq Corp. 386 running Microsoft Corp.'s Xenix, a Unisys Corp. 5000/85 supermicrocomputer and a reduced instruction set computing-based superminicomputer, which has not yet been identified.

Vendors will be able to run the tests in advance, with the final tests being conducted by Neal Nelson & Associates. The test results will be announced at the Unix Expo, to be held in New York Oct. 31-Nov. 2.

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NEW PRODUCTS — SYSTEMS

Processors

Macrolink, Inc. has introduced the **3200/Floating Point Accelerator** for real-time processing, scientific computing and computer-aided design and manufacturing applications.

The product extends the lifetime of existing superminicomputer models by allowing the main CPU to offload certain time-intensive computing functions, the vendor said. In addition to arithmetic functions, it performs a variety of trigonometric operations, and users may specify custom algorithms to be incorporated on the board.

The 3200/FPA costs from $8,995.

Macrolink, 1500 N. Kellogg Drive, Anaheim, Calif. 92807. 714-777-8800.

Data storage

Bering Industries has introduced a Hewlett-Packard Co.-compatible and removable Bernoulli drive in the 5¼-in. format.

The **Twinpac II** was designed to store backup data and can be transported, locked up, exchanged or archived more easily than the previous 8-in. cartridge, the vendor said.

The 5¼-in. format has also been incorporated into the single removable Bernoulli drive and combination removable and fixed drives. Both units are said to be 100% compatible with the HP 1000, 3000 and 9000 Series 200, 300 and 400 machines.

The Twinpac II costs $3,690; the Unipac II costs $2,990.

Bering Industries, 240 Hacienda Ave., Campbell, Calif. 95008. 408-379-4302.

I/O devices

Ioline Corp. has announced a **Roll-Feed System** for its LP4000 large-format pen plotter.

The product consists of both hardware and firmware and was designed to accommodate roll-stock media. The device automatically advances and aligns media prior to plotting and provides options for customizing output. The system can be ordered as an option on the LP4000 plotters or purchased as a field upgrade.

The Roll-Feed System costs $199.

Ioline, 12020 133th Ave. N.E., Kirkland, Wash. 98034. 206-821-2140.

Wespercorp has announced a single-board printer controller that is said to provide Printronix, Inc. printers with full compatibility with IBM System/34, 36 and 38 computer systems.

The **DLP38PX** printer controller is aimed at resellers of Printronix dot matrix line printers whose customers use IBM host minicomputers for data processing and word processing applications. The product reportedly serves as an interface between the computer and printer and converts IBM EBCDIC character codes to ASCII code to allow data transfer. A twin-axial connecting cable from the host system can be tied directly into the printer or cabled through to the next device.

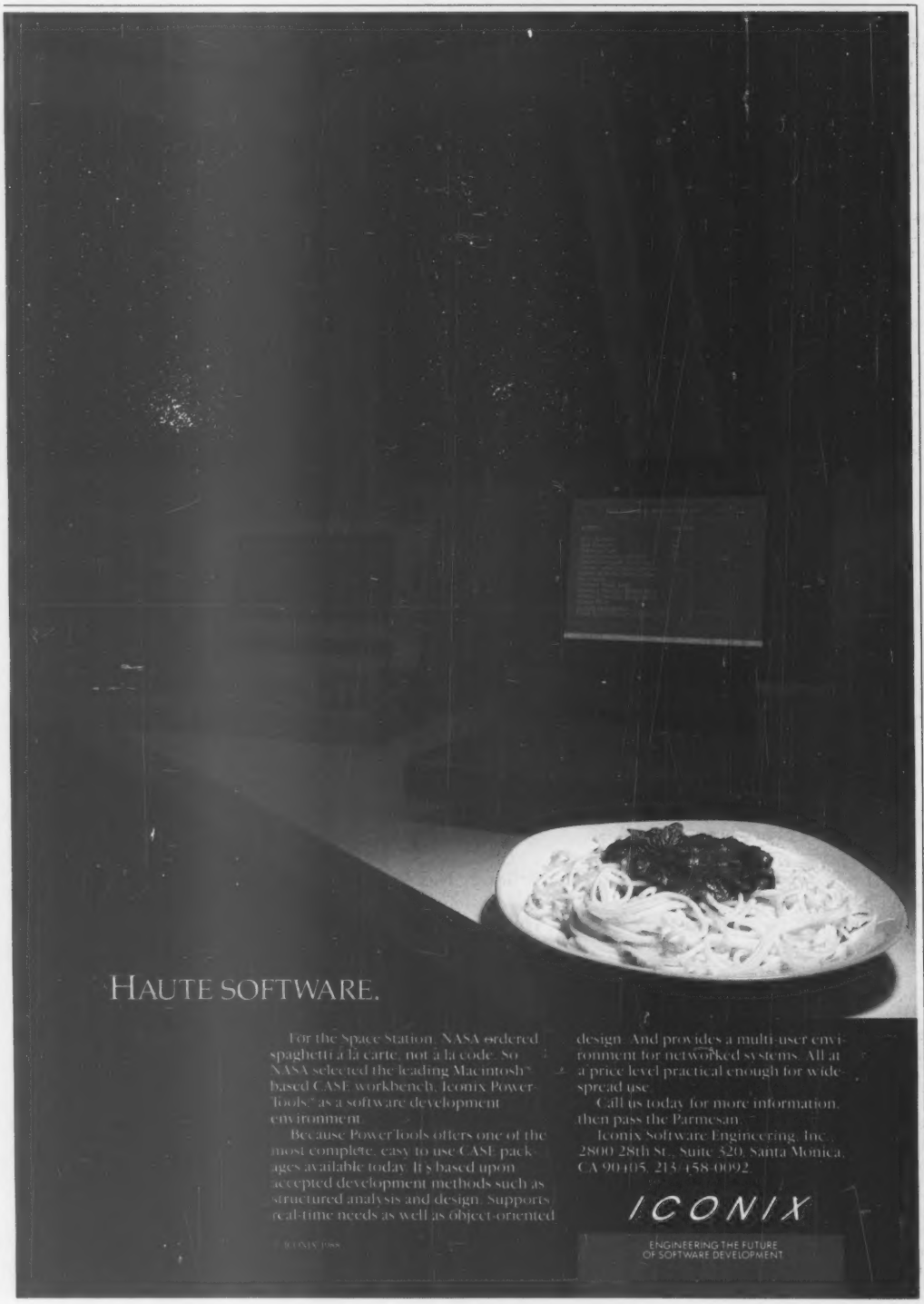
The DLP38PX, with interconnecting I/O adapter assembly, costs $900.

Wespercorp, 1821 E. Dyer Road, Santa Ana, Calif. 92705. 714-261-0606.

A stacker that holds as many as 1,500 pages of output from printers and copiers is now available from **Advanced Technologies International, Inc.**

Called **OS**, it reportedly allows users to print large volumes of material, in either portrait or landscape format, without having to monitor the output. OS was designed for use with the company's 2670 Laser Printer and with Dataproduct Corp.'s LZR 2600 Series and Toshiba Corp. copiers. OS costs $1,495.

Advanced Technologies International, 355 Sinclair-Frontage Road, Milpitas, Calif. 95035. 408-942-1780.



Intelligent Information Systems, Inc. has expanded its presence in the IBM 3270 arena with the announcement of two seven-color display workstations.

Dubbed the **IS-392C** and the **IS-392F**, the units offer a 14-in. nonglare diagonal screen that is built into a tilt-and-swivel cabinet. A printer port is included for local-screen copy. The Model C is reportedly plug-compatible with the IBM 3192 Model C workstation and connects directly via coaxial cables to the IBM 3174 and 3274 control units and the IS-374R. The IS-392C costs $1,795.

The IS-392F is plug-compatible with the IBM 3192 Model F workstation and connects to the same control units mentioned above. The IS-392F costs $2,020.

Intelligent Information Sytems, 92 Kansas St., Hackensack, N.J. 07601. 800-524-2837.

Robotics

A **Servo Controller Board** for VME-bus computers is now available from **Lynx Real-Time Systems, Inc.**

Designed for robotics developers, the board reportedly can reduce hardware costs as it eliminates the need for a specialized microcomputer controller, the vendor said. The product is supported by Lynxos, the company's Unix-compatible, real-time operating system. Applications can be written in C, and the controller is said to work with any VME-bus computer or real-time operating system.

The Servo Controller Board costs $1,800.

Lynx Real-Time Systems, 550 Division St., Campbell, Calif. 95008. 408-370-2233.

Power supplies

An **1800 VA standby power source** (SPS) has been introduced by **Sola Co.**, a unit of **General Signal Corp.** The device is intended for general use with a variety of computers and sensitive electronic equipment, the vendor said.

The unit provides off-line battery and inverter backup power for protection against power failures and incorporates fuse-protected input circuitry to prevent damage to the unit in the event of a short circuit. An audible alarm sounds to signal failure and repeats approximately every 30 sec. to remind the user that battery operation is in effect.

The 1800 VA SPS operates on 120V, 60Hz input and plugs into any standard AC outlet. It costs $1,899.

Sola, 1717 Busse Road, Elk Grove Village, Ill. 60007. 312-439-2800.

Maintenance equipment

Electronic Service Specialists Ltd., a Bell Atlantic Corp. company, has announced it is adding **depot repair services** for the Digital Equipment Corp. LNO3 laser printer.

According to the vendor, support will be provided in two areas: spare parts and depot repair services. The average turnaround rate is predicted to be between three and five days. In addition, the company will offer a one-year warranty on all new and refurbished parts, and maintenance training will be provided.

Pricing is available from the vendor.

Electronic Service Specialists, N92 W14612 Anthony Ave., Menomonee Falls, Wis. 53051. 414-255-4634.

Intelogic Trace, Inc. is now offering on-site repair services for IBM System/34 and System/36 minicomputers.

The program offers users guaranteed repair services based on individual customer requirements. The company maintains that if repairs are not made within the specified time frame, customers will receive credit for the monthly service fee for the malfunctioning System/34 or 36 equipment. The repair services will be located in 22 major metropolitan areas throughout the U.S.

Intelogic Trace, P.O. Box 400044, San Antonio, Texas 78229. 512-558-5444.

Two 6½-digit multimeters have been introduced by **Prema Precision Electronics, Inc.**

The devices reportedly offer a 24-hour DC voltage accuracy of four parts per million and feature continuous integration, linearity and long-term accuracy.

The **Model 5001** provides both DC and AC voltage and current as well as two-wire resistance. Resistance ranges are from 200 to 12 mOhm with 1 mOhm resolution. The Model 5001 costs $1,295 and includes IEEE 488 control as standard.

The **Model 6001** incorporates the same features as the 5001, with the addition of four-wire resistance and direct-reading PT-100 temperature with 100 uOhm resolution and a tolerance of 0.05 C. It is priced at $1,695 and includes IEEE control.

Prema Precision Electronics, Suite E-5, 4650 Arrow Highway, Montclair, Calif. 91763. 714-621-7292.

Neal Nelson & Associates, a computer consulting and performance-testing firm, has announced availability of **Remote Terminal Emulator** (RTE).

RTE is a measurement technique used to evaluate computer hardware. It permits the creation of custom scripts and measures computer performance using actual software applications. It reportedly can be driven by any Unix-based computer and can test any system.

Pricing depends on number of lines and scripting requirements.

Neal Nelson & Associates, 35 E. Wacker Drive, Chicago, Ill. 60601. 312-332-3242.

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VM Teleprocessing	*10/25/88* Chicago
VM/CMS Workshop	*10/31/88* Columbia (MD) *11/28/88* Chicago
Assembler Workshop	*10/31/88* Houston
VSAM Workshop	*11/28/88* Houston
CMS Structure & Flow	*11/1/88* Columbia (MD)
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MVS Supervisor & Data Management Workshop	*11/14/88* Houston
MVS Installation Workshop	*11/28/88* New York City
PROFS Installation and Implementation	*11/29/88* Santa Clara (CA)

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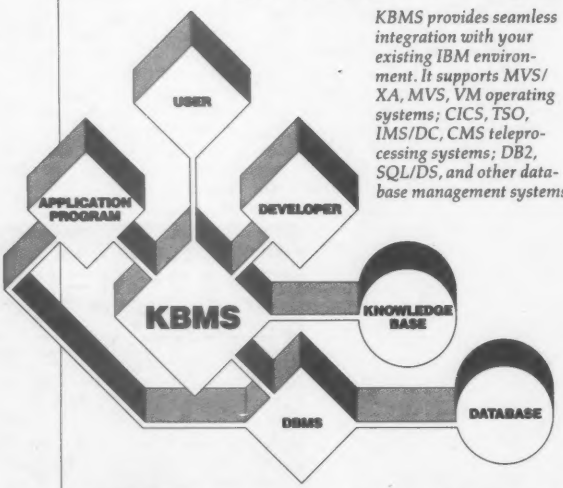

KBMS provides seamless integration with your existing IBM environment. It supports MVS/XA, MVS, VM operating systems; CICS, TSO, IMS/DC, CMS teleprocessing systems; DB2, SQL/DS, and other database management systems.

KBMS

A major computer company is saving over $25 million a year on product ordering and configuration, thanks to expert systems they developed in-house.

A leading financial services company has substantially reduced bad credit losses with a computerized system they developed based on artificial intelligence.

These are true stories. Yet expert systems still have not taken a serious place in the business world.

Why? Because they've been available only on specialized systems using esoteric languages like LISP and PROLOG. So, like the companies described above, you could only benefit from knowledge-based systems if you had a great deal of money, people and time to make them work.

Until now.

THE PRACTICAL BREAKTHROUGH: FULL INTEGRATION WITH IBM AND DATABASE SYSTEMS.

Now AICorp has developed a knowledge base management system called KBMS that is ready to take its place –along with database management and fourth-generation languages–as a major competitive business tool.

KBMS is a mainstream software system that is an extension of conventional DP practices. It provides seamless, high-level integration with your existing applications and databases.

The system runs under major IBM operating systems, teleprocessing systems and database management systems. It can be integrated with your existing applications by calling a KBMS module from a standard COBOL program, or vice versa. It even has the speed and processing power to be used in high-volume, transaction processing applications.

Perhaps most important of all, you can implement KBMS using the experience, hardware and software investment you have in place already.

IMPLEMENT A NEW CLASS OF APPLICATIONS.

KBMS makes it possible for you to develop practical solutions for whole new applications areas–applications that are strategic and crucial to your business, but simply have been too complex to solve with traditional, procedural programming approaches.

For example, manufacturing companies can use KBMS to build an expert system for reviewing every incoming order for proper configuration. Insurance companies can use it for underwriting decisions to guarantee that corporate policy is always followed. Energy generating companies can use it to better predict energy needs. And financial organizations can use KBMS to enforce credit approval guidelines.

Any business problem that is complex, governed by many interrelated rules and policies, and subject to frequent change is a candidate for KBMS.

HOW KBMS WORKS.

KBMS, which stands for Knowledge Base Management System, incorporates the four key techniques of AI programming methodologies: goal-directed reasoning (backward chaining), data-driven reasoning (forward chaining), hypothetical reasoning, and object-oriented programming.

By combining these techniques in one integrated system, KBMS gives your business applications the full "reasoning" power of expert systems technology, allowing you to address a wide range of applications with a single product.

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AICorp, a developer of AI-based mainframe applications for more than 10 years, and the creator of the INTELLECT™ natural language system, is holding a series of seminars that will show you how KBMS can provide a measurable, significant and immediate return on investment for your company.

To register for the seminar in your area, please call (617) 890-8400. AICorp, 100 Fifth Avenue, Waltham, MA 02254-9156.

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KBMS is a registered trademark and INTELLECT is a trademark of AICorp, Inc.

NEW PRODUCTS — SOFTWARE

Database management systems

Oracle Corp. has announced that **Oracle** and related development and end-user tools are now available to run on IBM mainframes under the DOS/VSE/SP operating systems. The products will also provide full support for CICS/VS for systems running in an on-line environment.

The products will allow VSE users to produce applications and offer end users services via the Oracle fourth-generation language and decision-support software tools. Users must have DOS/VSE/SP Release 2.1 or above as well as ICCF/VS. Customers using CICS/VS will require Release 1.6 or higher.

Pricing is based on computer size and ranges from $20,000 to $176,000.

Oracle, 20 Davis Drive, Belmont, Calif. 94002. 800-345-3267.

Development tools

RD Labs, Inc. has announced **RD/Comm**, a product that reportedly allows programmers to create IBM VM/CMS multiuser, multiprocessing or service machine applications in common high-level languages such as Cobol, C or Pascal.

The product provides high-level language interfaces to Inter User Communications Vehicle, thus eliminating the need to use CP or CMS assembler macros. It also provides applications with enhanced capability to handle interrupts from the console, reader and timer.

RD/Comm is available at an introductory price of $2,995. A free 30-day trial is available.

RD Labs, 3825 Atherton Road, Rocklin, Calif. 95677. 916-624-5755.

Applications packages

LSW, Inc. has developed a software package that will handle customer complaints and inquiries in a customer service environment.

Called the **Customer Assistance Tracking System** (CATS), the product reportedly provides on-line complaint registration forms, status reports, management reports, automatic reminders and optional interfaces to a user's existing system. Written in Cobol, the package runs on computers that support the Santa Cruz Operation, Inc.'s SCO Xenix or Unix operating systems.

The product is also said to operate on Prime Computer, Inc. and Digital Equipment Corp. computers and on an IBM Personal Computer AT compatible under Xenix. The minimum memory requirement is 2.5M bytes.

Pricing is dependent on system configuration. Typically, CATS will cost from $15,000 to $20,000 for a multiuser personal computer version and between $25,000 and $50,000 for a minicomputer system.

LSW, 8240 Professional Place, Landover, Md. 20785. 301-459-2323.

Morino Associates, Inc. has released its **I/S Inventory and Assets Management** (I/S IAM) package. The cost-management product was designed to assist data center and network managers in keeping track of their expanding inventory of equipment and software, the vendor said.

The product reportedly provides multiple users with immediate on-line access to a centralized database of inventory records and asset-related financial information.

The management package is also said to provide cost analysis and chargeback information, such as leasing and maintenance charges, taxes and depreciation. I/S IAM operates as a stand-alone package in an IBM MVS operating system environment, according to Morino Associates.

The price for I/S IAM will range from $10,000 to $29,500.

Morino Associates, 8615 Westwood Center Drive, Vienna, Va. 22180. 703-734-9494.

Banca Corp. has announced several major additions to its **Power 1** family of applications software for the commercial lending industry.

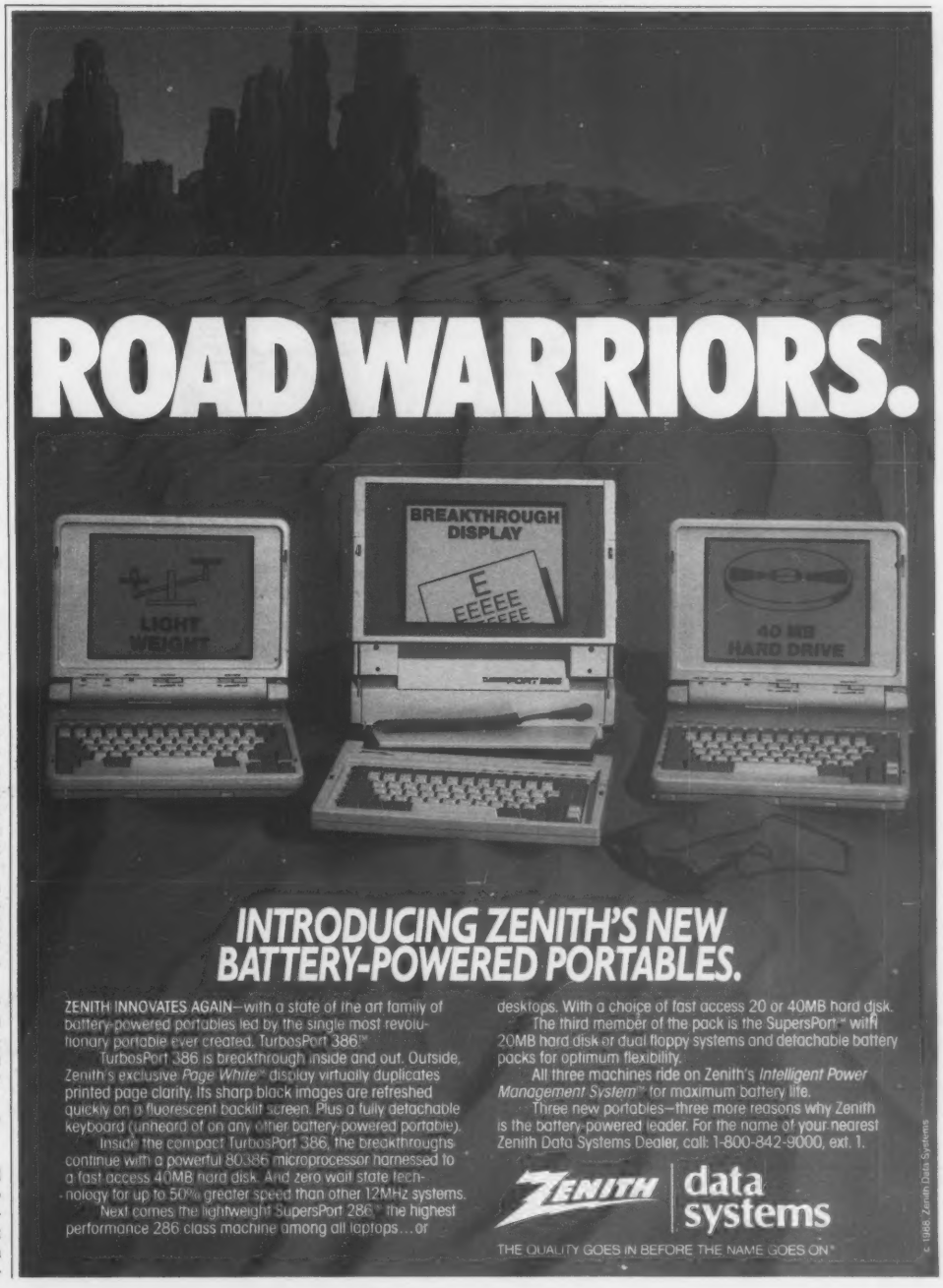
Power 1 is an office automation system that enables a financial institution to control and track commercial credits. The product also automates the production of text and documents associated with commercial lending.

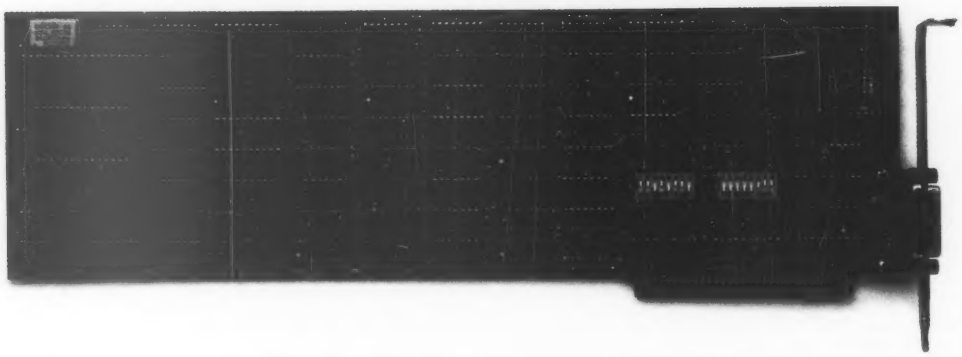
According to the vendor, Power 1 is available in an IBM version that will operate and support both two- and three-tier network environments using mainframes and/or IBM 9370 department processors connected to IBM Personal Computers or Personal System/2s. The IBM version of Power 1 will cost from $50,000 for the IBM 9370 Model 20, with higher prices set for larger machines.

Power 1 is also available on a modular basis for Wang Laboratories, Inc. VS-based systems users. These modules include credit packaging, tracking and forms generation, collateral compliance and loan-closing and legal forms generation functions.

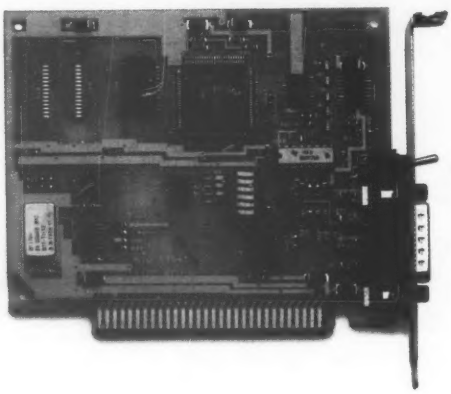
Pricing structures for the Power 1 modules are based on a three-year, full-payout, noncancelable lease.

Banca, Suite 1010, 14951 Dallas Pkwy., Dallas, Texas 75240. 214-788-0018.





We've knocked 88 chips off the old block.



We've not only knocked 88 chips off the old block, we've chopped the old block in half. As a result, it's the only 3X emulation board in the world with just four chips. And it has the name IDEA on it because it has a better idea behind it.

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MICRO BITS

Douglas Barney

Fighting fire with vapor

Dumb strategies collide. At first, PC cloners bragged about their ability to knock off copies of IBM's Micro Channel despite the legal hurdles. Next, they boasted of the technical superiority of the old but, of course, modified IBM Personal Computer AT bus. Then, they snickered about the Micro Channel's inability to accommodate older style add-in cards. Later, they had a field day when it became clear that IBM was losing market share.

And recently, they all cried foul when IBM demanded that those cloning the Micro Channel and threatening the fat profits of the big guns and the very survival of the bit players pay royalties.

So how do you top all that? Band together, think of an acronymn, hold a press conference, and explain to the world, "You know that stuff about Micro Channel clones? Uh, we were just grabbing for anything. What we really meant to say was, we won't clone it. Yeah, that's it."

Then to show us they're serious, they introduced the acro-

Continued on page 51

Money for nothing, PCs for free

BY MICHAEL ALEXANDER
CW STAFF

Department managers often pop the buttons off their shirts when talking about their high PC-to-employee ratios and other measures of information systems effectiveness.

But in their rush to put all those personal computers on desk tops, they may be spending money for nothing. The fact is, in many companies, PCs are underutilized, and the culprits are often the managers themselves.

"Only 10% of end users know how to use a PC to its fullest capacity," said Gary Gunnerson, an information center manager at Gannett Co. in Arlington, Va. "A lot stumble around; they learn one application and they do everything in it. That is all they ever learn how to do.

"We need to start teaching people about what the tools can do for them," Gunnerson added. "Rather than focus on applications training, we need to talk about tools training. We must tell end users, 'Here is the tool for the job.' "

Information center managers must give end users "rough rules of thumb," Gunnerson said, that start with the managers talking to end users about general business tasks and then demonstrating how PC applications can be applied to those tasks, rather than training end users in one or two specific computer applications and attempting to apply them to a variety of business chores.

Getting end users to move beyond using PCs for one or two applications is difficult, because department managers are not as well-versed in computer technology as they should be. Also, they are reluctant to invest the time to learn, some information center managers said.

One way information center managers can combat management's reticence to develop its own computer skills is to emphasize how the technology can be used in strategic decision making.

"If a PC is used only 10% to

Continued on page 50

Inside

- Exploring the EISA alternative. Page 41.
- Reaching new heights with a PC. Page 41.
- Computerland announces a private-label system. Page 55.

Unhappy user looks to Borland

BY DOUGLAS BARNEY
CW STAFF

SCOTTS VALLEY, Calif. — Richard Gump is the kind of guy Borland International President Philippe Kahn has got to love.

After years of using Lotus Development Corp.'s 1-2-3 and Ashton-Tate Corp.'s Dbase, Gump has had enough. He was sick of the high prices, weary of waiting for upgrades that never seemed to arrive and, he says, fed up with the attitudes of the software big shots. And the fact that these packages never seemed to work in unison also

Continued on page 47

Data View

Point of contention

IBM's bus and the proposed Extended Industry Standard Architecture bus sport similar capabilities

	Micro Channel Architecture	EISA
32-bit address	Yes	Yes
Supports burst-mode direct memory access	Yes	Yes
Supports multiple processors	Yes	Yes
Multidevice arbitration	Yes	Yes
Eliminates need for DIP switches	Yes	Yes
Supports AT-bus boards	No	Yes
Availability	April 1987	Late 1989

CW CHART

Nontechnical aid arrives

BY MICHAEL ALEXANDER
CW STAFF

End users who want specialized business applications but do not want to learn programming languages to get them now have options, thanks to two personal programming packages from Maxem Corp. and Clarion Software Corp.

Cause, available from Maxem, is aimed at nontechnical users who do not know how to program and programmers dissatisfied with the syntax requirements and the limited flexibility of programming environments

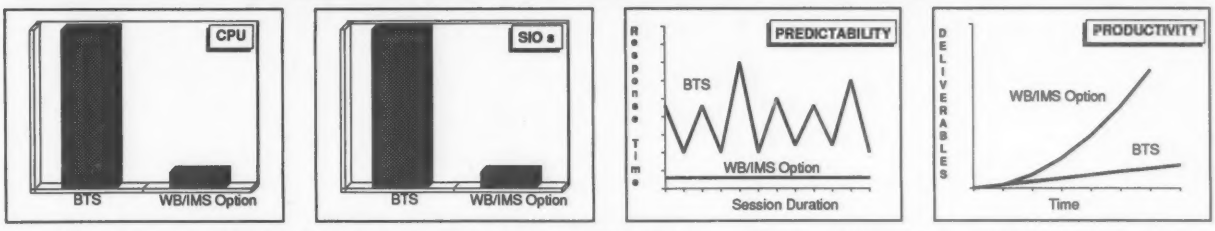
Clarion's Developer

in off-the-shelf spreadsheets and databases.

"The program allows me to do what I want without having

Continued on page 47

Technology Breakthrough: IMS DB/DC on a PC !



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Easy decision.

After all, 1-2-3 Release 2.01 has recently been rated the top-performing spreadsheet for an unprecedented fifth straight year by the NSTL[2]. In fact, 1-2-3 is the backbone of business, with over 7 million users who depend on it everyday.

Plus, the upcoming 1-2-3 Release 3[3] will be the most powerful spreadsheet on the market by far, yet it will offer the familiar 1-2-3 interface and be fully compatible with all your present 1-2-3 data, macros and applications.

The new 1-2-3 will offer an exciting 3-dimensional spreadsheet for better organization and consolidation of data. Plus, improved graphics and powerful database enhancements, including the ability to access external databases, like dBase®, from within your spreadsheet.

See your Lotus Authorized Dealer or Lotus sales rep for details.

Lotus 1-2-3

(1) Upgrade offer valid September 6, 1988 through 30 days after the 1-2-3 Release 3 ship date. (2) National Software Testing Laboratories, Inc. Software Digest Ratings Report, June, 1988.
(3) 1-2-3 system requirements will vary from Release 2.01 to Release 3. 1-2-3 Release 3 runs under DOS and OS/2; Hard disk and 640K required. Lotus certified compatible PC with 80286 processor or better recommended.
Lotus and 1-2-3 are registered trademarks of Lotus Development Corp. dBase is a registered trademark of Ashton-Tate Corporation.

MAC NUGGETS

Julie Pitta

Wrong price any time

IBM and the clone makers have stepped into the ring to fight it out over industry standards. It looked as though Apple, the spectator on the sidelines at this match, might be the ultimate winner. But Apple, by arbitrarily raising prices, may have found a way to avoid such a neat outcome.

The bout between IBM and the clone makers provided the perfect opportunity for Apple to step forward with a clear alternative to a fragmented standard. In a week in which it might have capitalized on IBM and the clone makers' intrafamily squabble, Apple decided to levy hefty increases from $400 to $1,100 on the upper end of the already pricey Macintosh line.

Apple blamed its decision on the scarcity of memory chips. Many wondered aloud whether the firm was taking advantage of the Mac's growing popularity to boost its gross margins.

The clone makers' move to challenge IBM for control of the next-generation personal computer bus architecture must have been some cause for celebration last week at Apple. IBM's Personal System/2 hasn't given only the compatible makers cause for worry; it has furrowed more than one brow at Apple.

Some have called Apple's lawsuit against Microsoft and

Continued on page 42

Defending the alternative to MCA

IN PERSON

When nine leading personal computer vendors and a host of third parties announced the Extended Industry Standard Architecture (EISA) as an alternative to IBM's 32-bit bus, it raised a lot of questions.

Shortly after the press conference, Senior Editor Douglas Barney sat down with Compaq Computer Corp. Vice-President of Marketing Mike Swavely to find out just what EISA hopes to accomplish. By most accounts, Compaq has led the EISA charge.

Being an industry veteran and

MCA challenger, *Swavely*

calmed by a radical reduction of his former rate of coffee consumption, Swavely answered a series of tough questions with remarkable aplomb.

Given that IBM is selling an incompatible architecture aimed at the future, aren't they doing pretty well?

People buying Micro Channel products today are not buying them because they have Micro Channel but because they have IBM's name on them.

What types of boards do people really want to bring over?

Communications cards are probably the most frequently used. Also, there are monitor interface cards (high-resolution) and more specialized cards.

What will really be an interesting area as we get into work group computing is some of the drive controllers and graphics controllers that will be very high-performance and very high-end. Those you would not build into any standard machine.

But you would be buying those for new systems, so the compatibility wouldn't matter.

Right, in that case.

You wouldn't want to

Continued on page 43

Climb every mountain, but use a PC

BY SALLY CUSACK
CW STAFF

Brian O'Malley has just returned from Mount Kenya, a 17,058-ft-high peak he and a companion conquered in just 12 days. As a two-man expedition, they carried their own equipment, food and climbing gear and used a project planning software package to help them organize the trip.

O'Malley is also a seven-year veteran firefighter and paramedic for the Denver Metro Fire Department and describes himself as a "serious amateur" photographer. He and his wife, Gayle, have a 4-year-old daughter and are expecting another baby in October. His climbing career started right after high school with ice climbing and gradually progressed to sophisticated mountain climbing.

It was after his trip to the summit of Mount Everest in 1985 that Primavera Systems, Inc. in Bala Cynwyd, Pa., approached him. The company proposed that O'Malley implement its Project Planner (P3) package when organizing his next expedition. O'Malley accepted.

The Everest expedition encompassed 22 climbers and 30,000 pounds of equipment. O'Malley contends he would never attempt a project of that proportion again without computerized assistance.

For the Kenya climb, O'Mal-

Continued on page 50

Food, water *and project management*

SOFT TIPS

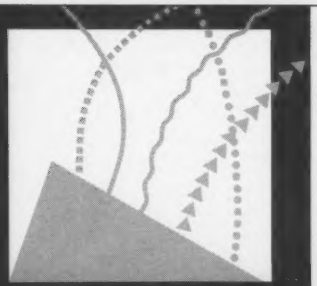
Orchestrating Symphony

If you start Lotus' Symphony 2.0 and receive the error message "INIT has not been run," run INIT on the original system disk and recopy that disk onto the hard disk. INIT must be run before copying Symphony to the hard disk.

If you install Symphony to display text and graphics together, you will get the error message "Invalid driver set." Go into Install, change Selected Equipment and say "No" to the option to display text and graphics together.

When problems occur while transmitting data from one PC to another using Symphony Communications, check the Settings sheets on both machines. They should be exactly alike. Make the necessary changes and retry.

Information provided by Corporate Software, Inc., a Westwood, Mass.-based software reseller.



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Bill Joy	Co-Founder and Vice-President, Sun Microsystems
Bob Metcalfe	Founder and Vice-President, 3Com Corporation; Ethernet® Inventor
David Boggs	Digital Equipment Corporation; Ethernet® Inventor

TECHNICAL SESSIONS

- TCP/IP Architecture for Hosts and Gateways
- Subnets
- Telnet User Interfaces
- Military Applications of Internetwork Technology
- Electronic Mail
- Building a TCP/IP Network
- NSFNET Backbone and The Regionals
- The Transition to OSI: Prospects for the Near Term
- Routing in the Proliferated Internet
- Network Security
- Transaction Protocols and Multicasting
- Interoperability Beyond TCP and NFS: The SQL Sequel
- TCP Performance Improvements
- Network Management
- Building Network Applications
- High Speed Networking

IN-DEPTH TUTORIALS

- In-Depth Introduction to TCP/IP
- Advanced Topics on the DARPA Internet System
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Microsoft tools with CD-ROM

BY STEPHEN JONES
CW STAFF

REDMOND, Wash. — Microsoft Corp. is hoping to breathe new life into its CD-ROM efforts with a compact disk featuring more than 20,000 pages of reference manuals and sample code for programmers writing applications for everything from MS-DOS to Fortran.

The Microsoft Programmer's Library is the computer programmer's version of Bookshelf, a compact disk/read-only memory (CD-ROM) product containing a dictionary, thesaurus and other materials that Microsoft is aiming at professional software writers.

The $395 Programmer's Library offers how-to references for a variety of Microsoft operating systems and programming languages, including OS/2, Windows, C, Basic, Macro Assembly and Pascal. Full documentation for each system — which can be as large as a telephone book — is compressed into the disk's ROM.

With the Programmer's Library, users can lift sample source code from each operating system and language from the disk and drop it into an application that is being written. The cut-and-paste sample code is designed as a shortcut for a programmer who wants to create such generic commands as a menu call but does not want to spend time writing the lines of code by hand, said Min Yee, vice-president of Microsoft's CD-ROM division.

The disk program, which is currently shipping, includes a search capability that allows a user to enter multiple search terms and narrow the range of a search to chapters or paragraphs in which the string of terms might occur.

Slow to jump on wagon

While the $395 price tag may seem reasonable, users cannot use the disk without a CD-ROM disk drive and a hard disk containing a big block of memory. Users have been slow to jump on the CD-ROM bandwagon in part because of the added cost of the CD-ROM disk drive. Other factors contributing to a lukewarm response to CD-ROM have been the lack of innovative disk applications and the technology's reputation as something of a laboratory curiosity.

Microsoft's Bookshelf has met with some success, but Yee said Microsoft is hoping to bootstrap CD-ROM technology by appealing to a wide base of programmers who are open to adopting new technologies and who continually wrestle with a growing list of programming manuals and references.

The Programmer's Library will be updated in early 1989 in order to include documentation for OS/2 Presentation Manager and LAN Manager, according to the company.

Pitta

CONTINUED FROM PAGE 41

Hewlett-Packard an admission that IBM has gained on Apple's user-friendly interface. The PS/2's user interface, the Presentation Manager, is based on Microsoft's Windows, which largely resembles the Macintosh user interface. Apple is hoping to prevent the scheduled shipment of the Presentation Manager.

The lawsuit promises to drag on for months and maybe even years. In the interim, it creates confusion among third-party software developers and end users. Last week's news of the formation of the Extended Industry Standard Architecture (EISA) will only add to the chaos.

Industry watchers have said that the EISA consortium is a get-even action. IBM stalled the compatible makers that eagerly sought licenses to the Micro Channel bus. Publicly, IBM executives issued vague statements regarding what patents it held and the terms for any licenses to its technology.

Finally, IBM tried to close out the clone makers through the PS/2 architecture — or at least keep the PS/2 profits for itself by charging licensing fees that ate heavily into the clone makers' profits.

IBM is reportedly requiring 5% of the total system cost in licensing fees for the Micro Channel. "That's some pretty awesome money to deal with," said Bill Lempesis, PC industry analyst at Dataquest, Inc.

In all likelihood, Apple will get for free from IBM and the clone makers what the company hoped it would get out of its suit against Microsoft and HP: alarm and confusion in the buyers of IBM-standard technology. The longer it lasts, the taller Apple stands above the fray. The company has successfully protected its technology, and the Macintosh stands as a standard without confusing competition.

But just when it appears that IBM and the clone makers have played into Apple's hands, Apple acts as if it isn't savvy enough to take advantage of the opportunity. Instead, it raises prices on its standard-setting machine. While attributed to memory prices, the Apple increases were not made across the board but go up on some machines and not others.

To customers looking for an alternative, Apple's action appears insensitive and an attempt to take advantage of the confusion in the IBM camp.

Pitta is *Computerworld*'s West Coast senior correspondent.

"I said, 'What if I cou computers in your compan really inexpensively.' He was so intrigued I was embarrassed to tell him how simple it was."

—Allen Rehert, AT&T Director of Data Networking

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Defending

CONTINUED FROM PAGE 41

bring over memory boards to a high-performance system because you would bog it down.
That's true. That is why the primary issue is more communications oriented. It has a lot to do with standardization. Many major accounts have a standard configuration they are used to installing and have significant leverage in support by only supporting a couple of configurations.

Did IBM make a strategic error by keeping its cards close to its chest on MCA specs, making board development difficult?
If IBM had the intent of making Micro Channel a standard, they certainly didn't do anything to facilitate it.

The real tough part was, they introduced a new architecture and said the reason for its incompatibility was it couldn't be done. We have demonstrated that today it is possible.

But you have only demonstrated your intent.
We would not be at the point of demonstrating the intent if we weren't absolutely sure it can be done.

Putting compatibility aside, isn't the Micro Channel a superior architecture to today's AT bus?
Absolutely not. It is halfway in between and doesn't get either job done.

Why I say it is stuck in the middle is that bus master capability and some of those things that are part of the Micro Channel have benefits when they are applied to the appropriate application. It turns out that those applications are not going to be satisfied with 16-bit bus master implementations. They are going to need a 32-bit bus master, which EISA provides and Micro Channel does not.

But you are talking about EISA in late 1989 vs. Micro Channel today. Isn't that an unfair comparison?
It is totally fair because Micro Channel cannot deliver any of those capabilities today.

But neither can EISA. Let's talk about what will happen in late '89.
In late 1989, which is about the time frame that IBM could realistically deliver any of those capabilities, EISA is there and has superior capabilities to Micro Channel.

Doesn't the Micro Channel have far more potential than today's bus and that is why EISA is attempting to blend the two?
In many senses that is true, and long-term, those are the areas where the industry-standard architecture would get topped out. Those are not today's applications and will not be today's applications until late 1989 at the earliest, whether they are under EISA or Micro Channel.

Are you assuming that the Micro Channel won't be enhanced?

> WE WOULD not be at the point of demonstrating the intent if we weren't absolutely sure it can be done.
>
> MIKE SWAVELY
> COMPAQ

I don't make that assumption at all. It has to be enhanced to deliver what IBM already promised.

So we don't know what the capabilities of the Micro Channel will be vis-a-vis EISA?
I feel sure that IBM will enhance it dramatically. In the way they have communicated about Micro Channel, IBM unintentionally created a lot of confusion about what the real capabilities of today's Micro Channel are vs. what capabilities it may offer at some point in the future. For example, they talk about multiple processors. On any of today's Micro Channel-based products, nobody is going to run multiple processors.

Will it be more difficult to exploit these capabilities if board makers are torn between Micro Channel and EISA?
EISA has made that an easy choice.

But they would have to give up a decent-size portion of the Fortune 1,000 by ignoring Micro Channel.
The market is segmenting in that way in any case. That is not a happy fact or a sad fact; it is just a fact.

We have three segments — Macintosh, Micro Channel and industry-standard architecture — and all three will continue for the indefinite future. Micro Channel is not going to go away even if IBM chooses to join the EISA group.

Were they invited to join?
Yes. They think the world should choose Micro Channel.

We are not saying that EISA is technologicaly the greatest thing since sliced bread forever and ever. In a lot of ways, EISA and the Micro Channel, as it evolves, could be said to be equivalent. One gives those capabilities in a compatible way; one does not.

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I said he could share spreadsheets, word-processed documents, anything. And, with AT&T Mail software, whenever information is received, a message indicator appears on the screen, so no one has to "check" for messages. In fact, information can be received without interrupting any ongoing work.

He could do it with the same software for everyone, so if people were transferred to another department, they didn't have to relearn a program. It could accommodate his needs now and anything he had going in the future.

All he had to do was subscribe to AT&T Mail, outfit his PCs with modems (if necessary) and that was it. The cost was minimal and, once he subscribed, he could get a full range of AT&T Mail service features as well.

Computer connectivity through AT&T Mail.

He said somebody back at the ranch was pretty smart.

I had to agree."

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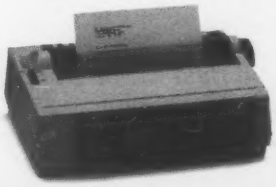

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Nontechnical

CONTINUED FROM PAGE 39

to write a lot of code," said Will Crandall, manager of commercial development at an 800-acre planned community in Val Vista Lakes, Ariz.

Crandall used Cause to create a program that would compile a database of tenants, prospective renters and other information that is required by the financial institutions that his organization works with.

Cause, available in versions for the IBM Personal Computer and Apple Computer, Inc. Macintosh family of personal computers, makes use of icons, windows, color (when available) and a mouse. A complete application can be created without the need to use a keyboard — except to type in labels for windows and data, according to Maxem.

"I enjoy the designing of the program but do not enjoy working with the tedious syntax problems," Crandall said. "This program has none of that. All you have to do is pick and choose from a menu. It is easy, yet powerful and effective."

There is a new generation of PC users who are no longer intimidated and who are ready to begin developing their own applications, said John Brandon, president of Raymond-Wayne Corp., a software developer in Colorado Springs that has been performing ongoing evaluation and testing of the program.

"Certainly the user is required to know the techniques of good system design, but Cause eliminates the tedious programming that goes with developing a program," Brandon said.

Cause is available for the IBM PC series of computers with 512K bytes or higher of random-access memory and for the Apple Macintosh with 512K bytes or higher of RAM.

For consumers

A consumer version of the product for either machine carries a suggested retail price tag of $495; a professional version in the same format carries a suggested retail price of $595, which includes a one-year license to market application programs.

A variety of Effects, applications that were developed with Cause, are also available at suggested retail prices ranging from $29 to $99.

While not as sophisticated, The Personal Developer, from Clarion in Pompano Beach, Fla., also enables end users to quickly create their own programs without requiring a programmer's skills or knowledge. It began shipping earlier this month.

The program includes eight applications that can either be used right out of the box or modified to fit individual requirements. The sample programs include such applications as Order, an order-entry and invoicing program and Member, a list management program.

"The program is easy to use," said Mike Hagan, senior vice-president of sales and marketing at Computer Intelligence Corp., a La Jolla, Calif., market research firm.

Computer Intelligence also uses Clarion's flagship product, The Professional Developer, to compile databases for research, sales and marketing.

From using that program, the salespeople developed a thirst to find a simple way to have the same capabilities for personal use — for instance, to keep track of such diverse information as sales quotas and names of restaurants at which to entertain business clients, Hagan explained. The Clarion Personal Developer requires an IBM PC, PC XT, AT or Personal System/2 and compatibles, IBM PC-DOS or Microsoft Corp. MS-DOS 2.1 or higher, 512K bytes of RAM — 640K bytes are recommended — and a hard disk drive.

The product carries a suggested retail price tag of $169.

Unhappy user

CONTINUED FROM PAGE 39

got Gump's goat.

So Gump and his insurance agency, Brinegar Jones & Gump, made a wholesale jump to products from Borland. The agency is not a major Lotus or Ashton-Tate customer; it has just eight personal computers, but its attitude toward Borland may be shared by other firms.

"They have the languages, the spreadsheet, the word processing and the database," Gump explained. "And they said they are going to make them all work together."

So instead of 1-2-3, Gump uses Borland's Quattro. And instead of Dbase, he uses Paradox. Now, Gump feels just fine. "I am in hog heaven," he exclaimed.

It was not just Borland's growing and improved product line that got Gump to switch. He also likes Borland's still-controversial style that many have criticized as overly flamboyant. "They are easy to do business with, their support is second to none and they won't send out a buggy product and then start fixing it," Gump said.

Gump said he can plan his product implementation strategy better with Borland. "It doesn't do things like Lotus, which announces it will ship in June and then in March, after the executives have sold their stock, say it will be late," Gump exclaimed. "If Borland says it will ship in September, it will ship in November," Gump joked.

So what is he doing with 1-2-3 and Dbase, which he paid good money to get? "They are on the shelf," Gump said. "I'll give you a deal."

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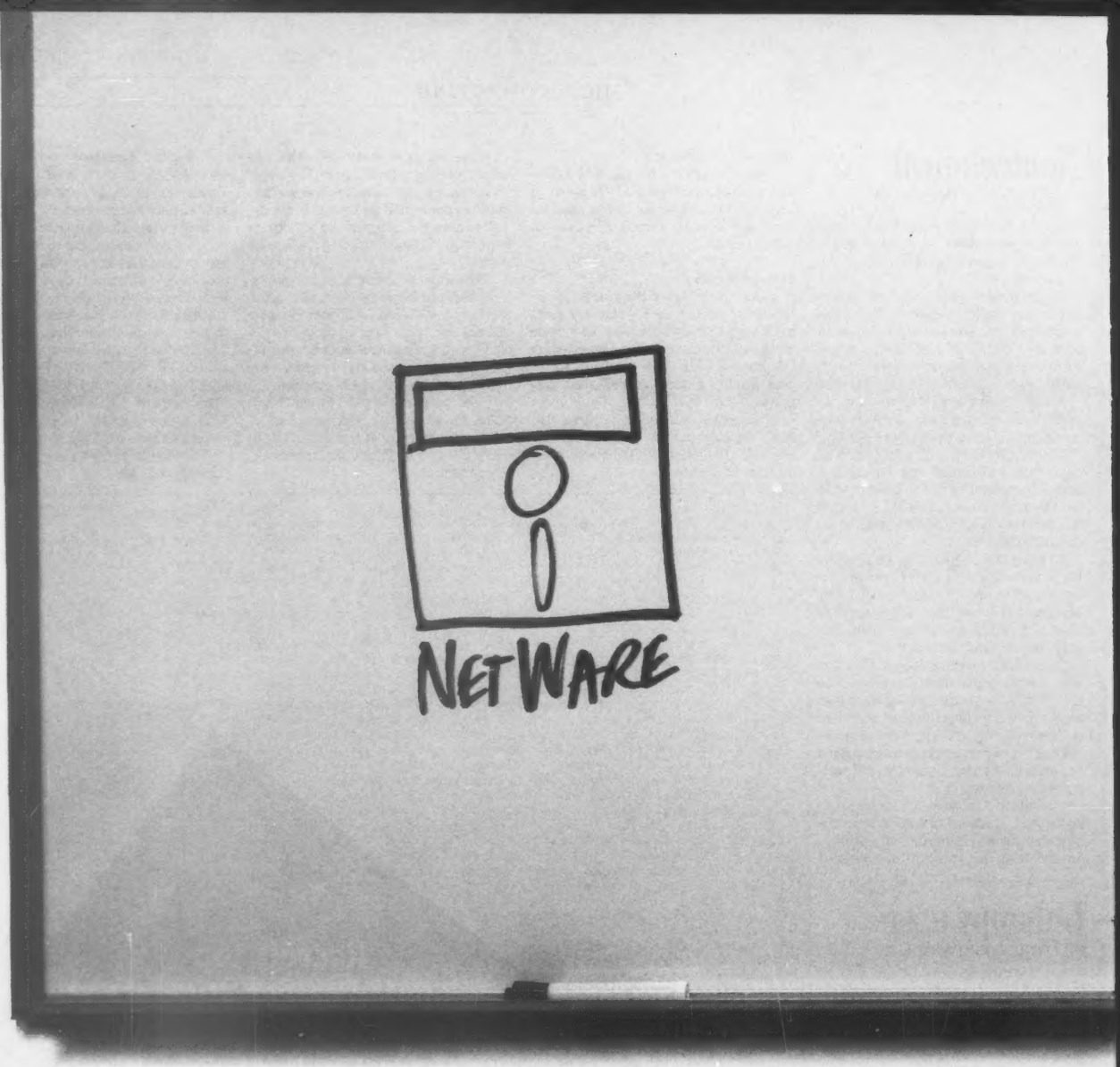

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That means you have the freedom to network everything from PCs to Macintosh, VAX to PS/2, 386 to mainframe host systems. So everyone can use the workstations they choose, without changing the way they work.

The power to choose. With NetWare, Novell gives you the most powerful combination of network performance, security,

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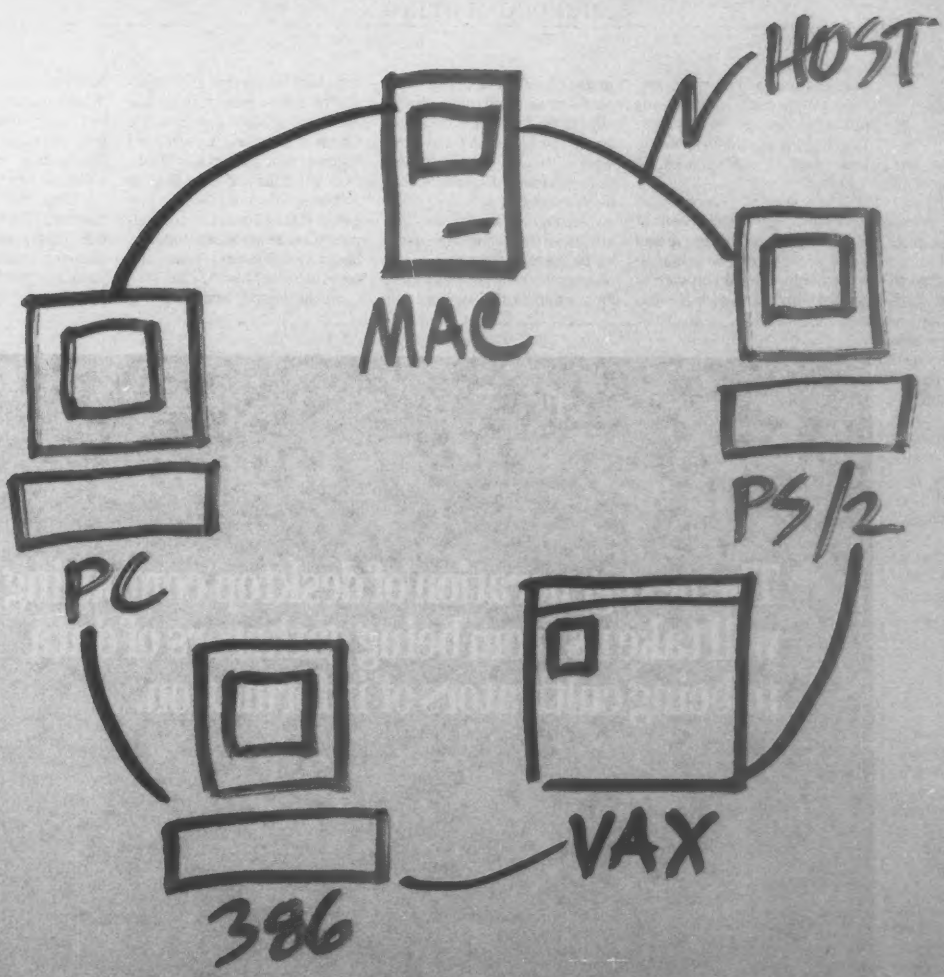


and you can choose all of these.

functionality and system reliability available. Plus you get the power to transparently connect to any of the more than two million users worldwide who have already chosen NetWare.

And as your computing needs expand, the network will grow with you. Giving greater networking capability and allowing you to connect to new environments.

The freedom to choose. Exercise your freedom to choose the desktop environment that best meets your needs. Choose the networking power of NetWare. See your Gold Novell Authorized Reseller, or call 1-800-LANKIND.

For more information, call from your modem 1-800-444-4472 (8 bit, no parity, 1 stop bit) and enter the access code NVFRE7.

NOVELL

For network solutions, you should be seeing red.

Money

FROM PAGE 39

20% of the time, it can cost-justify itself. But if you can show managers how to use it in other ways, then the return on investment can be in the thousands of percent," Gunnerson said.

A manager does not need to learn how to use PCs but must have an awareness that they are more than fancy word processors or calculators, said Lloyd Belcher, coordinator of executive information systems at Conoco, Inc. in Houston.

"Managers are coming to realize that information is a strategic weapon and that their success hinges on how fast they respond to and use technology," Belcher said.

Belcher advocates setting up a network of system coordinators, each allied with a specific business group. This way, systems people can learn the needs of the business group and more readily suggest ways to apply the technology to various tasks, he said.

The system coordinators would learn the specific needs of a particular business group and guide end users in determining what hardware and software is needed to accomplish the group's goals. The level of support is closely tied to the group's objectives. A coordinator, for example, could instruct end users whether to use a PC spreadsheet or a mainframe database to handle sales data.

Getting management involved with the company's use of its technology resources is one of several critical success factors for an information center, perhaps for reasons that even information center managers are not aware of, according to Beatrice Garcia, who recently completed a survey that attempts to identify new trends and directions in end-user computing. Garcia is a newsletter editor at Crwth Computer Coursewares, a computer-based training firm headquartered in Santa Monica, Calif.

In the Fourth Annual Crwth Survey, Garcia noted that 55% of information center managers in 475 corporations surveyed report that corporate management has minimal or no involvement with end-user computing.

"This lack of involvement hampers efforts by the information center of obtaining sufficient resources to meet the expanding needs of end-user computing," Garcia said.

Climb

FROM PAGE 41

ley used the software primarily for time-management purposes.

"Breaking down long-term goals in an expedition like this results in manageable, short-term deadlines," he says. "When goals are definite and measurable, it allows focus on specific tasks."

The specific tasks involved in the Kenya climb included food preparation notes, ticket purchase information, permit application dates and fees as well as visa and passport information.

Details, details

According to O'Malley, these seemingly minor tasks are extremely important in the overall picture. "The critical path starts long before you get on the trail," he says. For example, immunizations must be done two months prior to departure. If you forget, you don't go.

P3 is a professional project management control system for IBM Personal Computers and compatibles that includes resource management and cost control facilities. It allows for activity coding and bar charts and provides import/export capabilities to accommodate Lotus Development Corp. 1-2-3, Ashton-Tate Corp. Dbase and ASCII files.

O'Malley runs P3 on a Leading Edge Products, Inc. personal computer with 640K bytes of random-access memory and a 21M-byte hard drive. He said the Kenya project is fairly small in relation to the software's actual capabilities.

The software requires an IBM PC XT, AT, Personal System/2 or compatible system running DOS 2.0 or higher. A minimum of 512K bytes of RAM and a hard drive are also necessary for operation.

The next generation of desktop computing will take us from being gatherers of data to being cultivators of information.

© 1988 Metaphor Computer Systems.

Barney

FROM PAGE 39

nymn EISA, or Extended Industry Standard Architecture, and they tell us that it will be better than IBM's bus, even though it hasn't been built yet.

It's simply a case of fighting fire with vapor, a technique as ineffective when used against IBM as it is against forest fires in Yellowstone National Park.

But this wasn't the clone makers' decision alone. No sir. Users specifically told them not to clone the Micro Channel. The funny thing is it looks like none actually got asked. After all, this is the computer business in which groups of vendors regularly get together to decide what's best for the customer.

It is kind of like the big automakers getting together to decide that we need worse gas mileage. In this case, the cloners decided that it is better for us to wait a whole year to get a bus that matches the potential of the Micro Channel.

About now, you may be worried that more nice things will be said about IBM. Wrong, bus breath! IBM has not exactly been acting in the users' best interests either.

The company yanked the old products off the shelf way too soon. By not cooperating, it made it too hard for third parties to develop boards. It sent mixed signals about legal obstacles in the path of Micro Channel imitation. And it has failed to show any real advantage to what is theoretically a vastly superior bus.

Some may call this a series of strategic moves to slice off a protected and profitable slab of the market, commodity market share be damned. Bashers see it as sheer corporate stupidity.

Whether it's pea-brained or shrewd, it looks like IBM is offering a move to the future (as long as back-stabbing competitors don't shatter the business into umpteen silly standards).

Now is the time for the next-generation PC bus to get rolling properly. But first, IBM will have to knuckle under and slash those royalties. Then, EISA could smarten up and kick out a Micro Channel compatible that would knock our socks off. And then, maybe they could both tell the truth and offer to sell their products only to people who plan on using advanced PC features like multiple, dedicated processors and lots of simultanous communications.

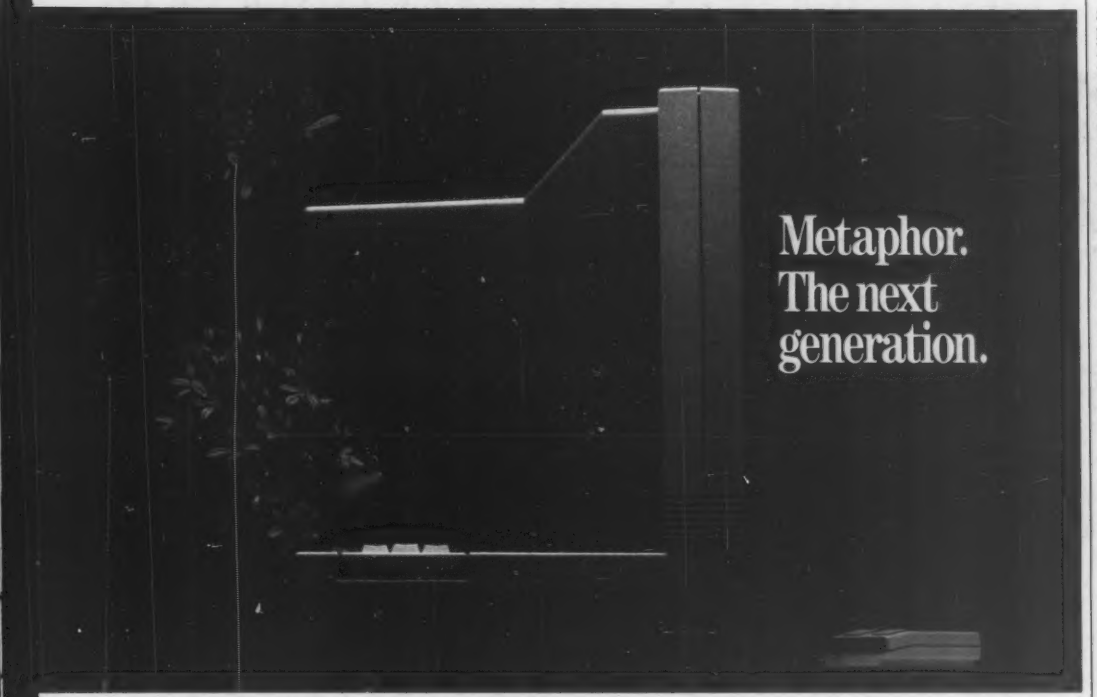
Users should not take no for an answer. They should band together, get their own acronym and set a deadline. If these measures are not taken, there will have to be a referendum to ban people from calling computers a fast-moving business. With IBM and EISA in command, the industry is now going full bore, in reverse!

Dad's Release 3 dilemma. When Lotus said its 1-2-3 Release 3.0 would demand at least an AT in order to work decently, I thought of my Dad. As a hard-core 1-2-3 user, he is really looking forward to trying out the new version when it arrives.

The only problem is that Dad is a two-PC kind of guy. He's got an AT at work and an XT clone at home. Now come the tough choices. He could use Release 3 at work, Release 2 at home and put up with the idiosyncrasies of both. He could run Release 3 on both and live with the shabby performance at home. Or else, he could just stick with Release 2, period.

"What's that Philippe? Tell him to buy what?"

Barney is a *Computerworld* senior editor, microcomputing.



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Announcing The Cipher 3000i Half-Inch Cartridge Tape Drive Family.

Now Cipher introduces the solution the industry has been waiting for. And it's revolutionizing the entire concept of data interchange.

Until now, most new products in the tape drive market have been too big and too expensive. Or too small to perform with midrange and small mainframe systems.

What's been needed is a family of tape drives offering the performance, price and form factor required by low-end and midrange systems. Plus an economical means of interchanging data from low to high-end computers.

It begins with a new standard recording format: MSR-Multi-track Serpentine Recording. Now for the first time data can be interchanged from micros to small mainframes with amazing new levels of performance and economy.

Cipher makes this possible with an all new family of MSR-compatible half-inch cartridge tape drives. The Cipher 3000i family. Compared to standard technology, they offer space saving benefits that are nothing short of phenomenal.

The 3000i records on industry standard 3480-type cartridges, each with a formatted capacity of 320 megabytes. An optional 10 cartridge stacker increases total storage capacity to 3.2 gigabytes. There are 2 different 3000i series with 26 models in all. The series with an 8-inch form factor is the world's first tape drive system to address the size and high performance needs of workstations, midrange systems and small mainframes. The 5 1/4-inch form factor series will complement the economy and performance of micros and low-end minis.

What about backup speed? Transfer rates range from 242 to 896 kilobytes per second. For instance, a Cipher 3000i drive, using only 2 cartridges, can backup a 500 megabyte disk in just 11 minutes. A high performance GCR open reel drive takes 4 reels of tape and twice the time to do the same job.

The 3000i offers a choice of configurations including horizontal or vertical mounting, tabletop and 19-inch rack mount versions. System integration couldn't be easier with a wide selection of interfaces—Cipher/Pertec, SCSI and IPI-3. AC or DC power. And standard 9-track reel-to-reel functionality is a special feature of the 3000i. This ensures compatibility with existing system software and protects the enormous investment in software development.

The 3000i continues in the same tradition as our 1/2" reel-to-reel streaming tape systems, now the industry standard. Cipher also developed cached tape drives, and the widely used end loading device on 1/4" streaming cartridge systems. The company is also at the forefront in optical disk drive technology, subsystems and interfaces—including the new SCSI-2.

Supported by the full resources of an international service and spares network, the 3000i family is destined to forever change the concept of data interchange. But then, would you expect anything less from the world's leading independent removable data storage systems company. For more information on MSR and the 3000i family contact Cipher today. Cipher, 10101 Old Grove Road, San Diego, CA 92131-1650.

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PSM-03

PSC-28

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Requires proper adapter card

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NEW PRODUCTS

Systems

Sytron Corp. has announced **Version 3.10** of its **Sy-Tos Tape Operating System.**

The latest release was developed for the DOS environment running on Wyse Technology, Inc.'s WysePC 386, Models 3216-85T and 3216-150T. According to the vendor, the system is included on the designated Wyse machines, which are equipped with 60M-byte ¼-in. cartridge tape drives. The tape backup software reportedly supports menu-driven, command-line and batch-file operations and allows for file-by-file backup.

Sy-Tos for the DOS environment costs $99.95. Wyse Technology will include Sy-Tos at no extra charge in the Wysepc 386 3216-85T and 3216-150T.

Sytron, 135 Maple St., Marlboro, Mass. 01752. 508-460-0106.

Computerland Corp., a retailer of personal computers, has introduced its first private-label microcomputer system.

Dubbed the **Sysdyne Exclusive/286**, the system is reportedly equipped with an Intel Corp. 80286 8- to 10-MHz dual-speed microprocessor and includes 640K bytes of random-access memory, which is expandable to 2M bytes. The product is 5½-in. high by 14½-in. wide and measures 15 in. in length. Other features include a 101-key keyboard, one 3½-in. 720K-byte floppy drive and an additional 3½-in. drive bay.

The Sysdyne Exclusive/286 costs $1,595.

Computerland, 2901 Peralta Oaks Court, Oakland, Calif. 94605. 415-639-2026.

Software applications packages

A computer program that was written to help ease normal stress associated with the office workday environment is available from the **Salinon Corp.**

The program, named **Off-The-Wall**, reportedly creates thousands of humorous, unusual and nonsensical on-line expressions. Different phrases are created from a built-in library and built-in word dictionaries. Users may add their own patterns to the library and control the placement of nouns, adjectives, adverbs and verbs to fit any working environment.

Off-The-Wall costs $29 and runs on IBM Personal Computers and compatibles under DOS 2.0.

Salinon, Suite 115, 7424 Greenville Ave., Dallas, Texas 75231. 214-692-9091.

Zypcom has released a program called **Area Calculator** designed specifically for businesses that must apply dimensional mathematics. The software runs on Microsoft Corp. MS-DOS operating systems and provides area calculations for right-angled, dimensional figures. It will also perform calculations for any four- to 12-sided figure.

The vendor claims the program provides detailed instructions and that calculations are exact to two decimal places. A diagram of the figure is presented on the screen for data input verification.

Area Calculator costs $29.95.

Zypcom, P.O. Box 3421, Boise, Idaho 83703. 208-345-2387.

Software utilities

A utility that allows programmers to create custom tutorials and demonstration software programs is now available from **Daybreak Technologies.**

The vendor describes **Cocoon** as a keystroke-logging utility that protects work from power and system failures, accidents and human error.

The program is reported to be virtually invisible and runs in a background mode while logging every keystroke to disk. Approximately 10K bytes each of DOS and hard disk memory are required per work session. The product can also be used to create keyboard macros and debug programs.

Cocoon costs $99 and requires IBM or compatible personal computers with a hard disk and DOS 2.0 or higher.

Daybreak Technologies, 3rd Floor, 21311 Hawthorne Blvd., Torrance, Calif. 90503. 800-443-0100.

Macintosh products

E-Machines, Inc. has announced two 21-in. display systems that reportedly feature software-switchable resolutions of 36, 40, 72 and 80 dot/in.

The display systems were designed specifically for Apple Computer, Inc.'s family of Macintosh machines.

Called the **Big Picture Z21** and the **Big Picture Z21 IQ**, the displays allow users to see two complete 8½- by 11-in. or international A4 pages including margins, the vendor claimed. A plug-in **Z21 Memory Module** is available that permits Big Picture Z21 users to upgrade to the Z21 IQ gray-scale display system. The units are shipped with a video controller, monitors, cables, software and tilt base, and the firm offers a one-year warranty. Deliveries are scheduled for October.

The Big Picture Z21 costs $2,495, and the Big Picture Z21 IQ costs $3,495. The Z21 Memory Module costs $1,095.

E-Machines, 9305 Gemini Drive S.W., Beaverton, Ore. 97005. 503-646-6699.

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When your success depends on making great-looking documents, you need a laser printer that's versatile enough to handle just about anything that comes up. That printer is Texas Instruments OmniLaser™ 2106.

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Today, people in every pursuit are changing to desktop publishing to give their documents an edge. With over 600 software packages supporting PostScript, TI's OmniLaser 2106 gives you the power to print today's documents and then go far beyond. Because not only does the OmniLaser emulate the HP LaserJet Plus™, it also features Adobe PostScript. So your documents look better, communicate faster and sell harder.

TI's OmniLaser 2106 with PostScript gives you excellent control over type, graphics and page composition.

Improve your standard of printing.
TI's OmniLaser 2106 gives you great graphics, text that looks typeset and paper handling features that allow you to print on envelopes, legal size and more. It also features multiple industry-standard emulations and interfaces. All easily selectable at the touch of a button.

TI's OmniLaser 2106. It's the laser printer of your future, as well as the one you need right away. The OmniLaser family also includes the 2108 small-cluster printer and the 2115 shared-resource printer. **For a free brochure on how to choose a laser printer and information about TI's on-site warranty, call 1-800-527-3500.**

TEXAS INSTRUMENTS

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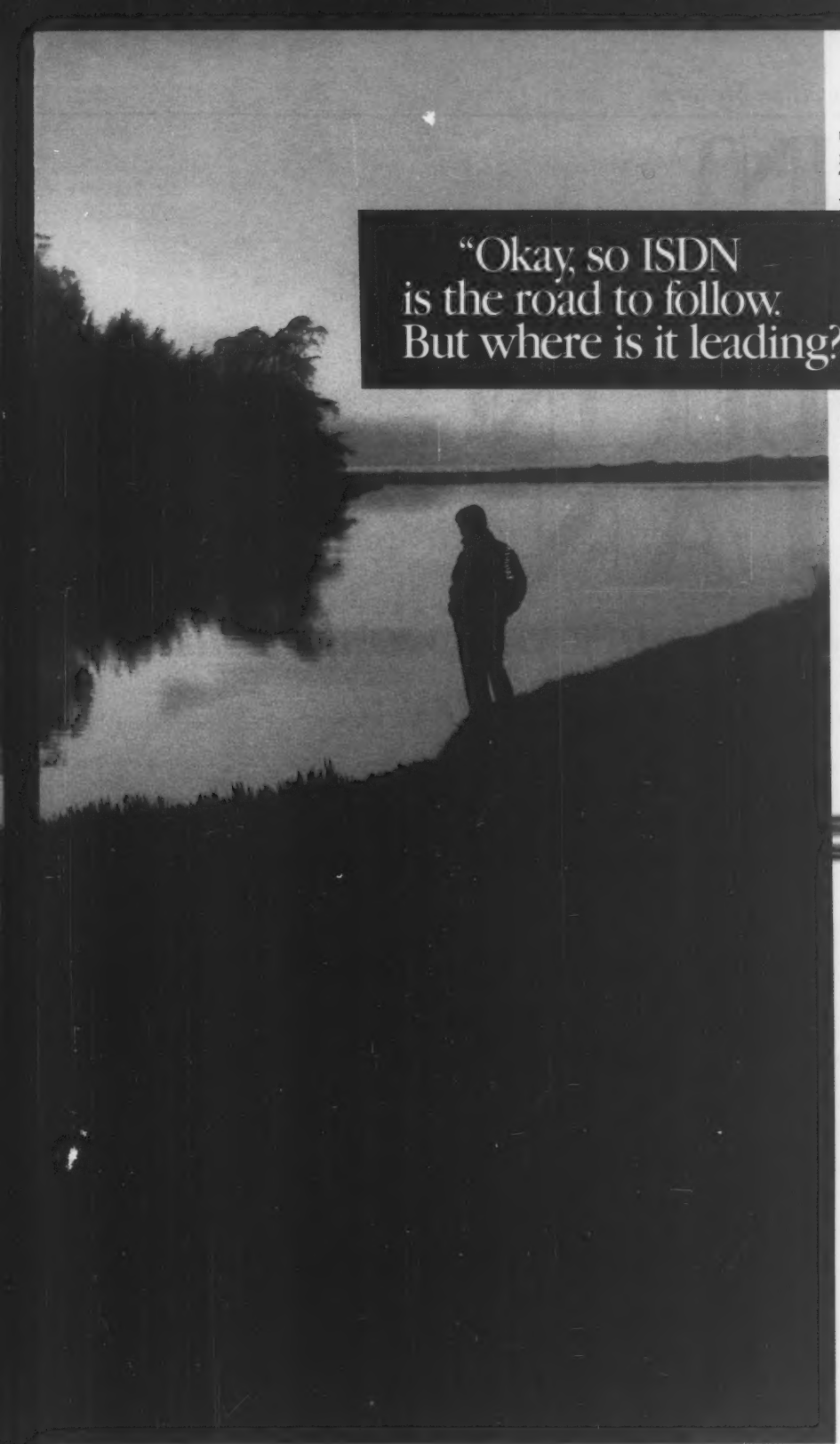

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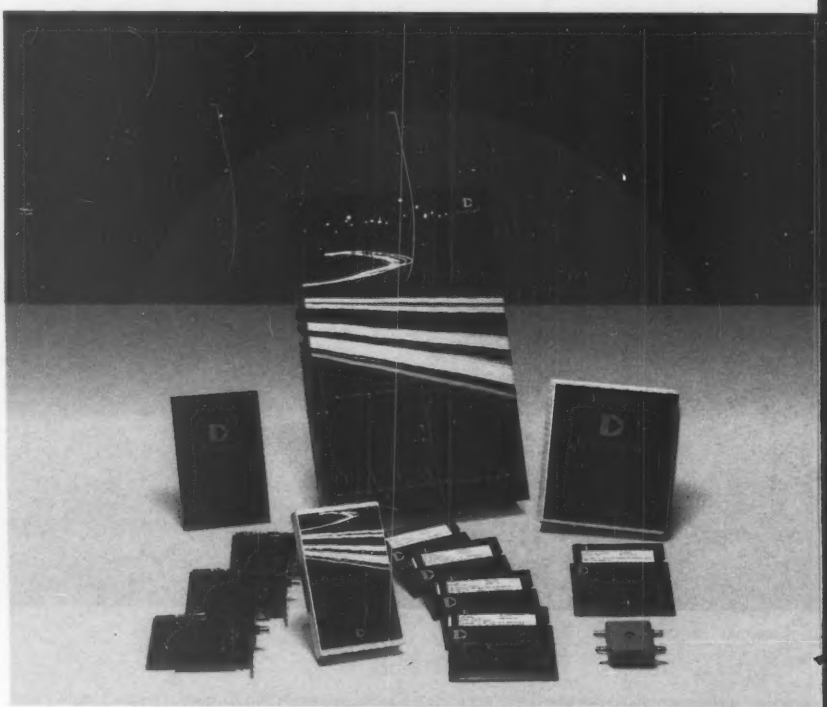

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DATAPOINT

DATA STREAM

Kathy Chin Leong

E-mail forms fat attitude

Now that networking has become a common, everyday phenomenon at many companies, there is a danger that employees are beginning to take the joys of data communication too much for granted.

Professionals currently rising through the ranks today risk becoming fat and impersonal as they increasingly opt to send messages electronically rather than exerting themselves by actually walking over to verbally greet a co-worker.

That same co-worker can be resident in the cubicle next door, but the efficiency of electronic messaging is so much more fun, isn't it? So send that E-mail message to your expanding midsection!

Some people are actually better at communicating via E-mail than in person. By fostering electronic communications socially, Corporate America is the culprit that is cultivating a society of employees who are rapidly losing their social graces. Simple things like saying hello or asking about the kids or giving someone a compliment on the excellent work he did will be-

Continued on page 64

IBM tied to Decnet

Helps Interlink form SNA-to-Decnet connection

BY KATHY CHIN LEONG
CW STAFF

FREMONT, Calif. — Last week, Interlink Computer Sciences, Inc. announced Decnet-to-SNA connectivity and management products that were developed with IBM's help and which Digital Equipment Corp.'s chief rival will be marketing in the future.

IBM, which reportedly already markets Interlink's existing SNA-to-Decnet gateways, announced in August its intention to offer technical assistance in Interlink's Systems Network Architecture (SNA) product development. The fruits of this union include a Decnet-to-SNA gateway based on IBM's LU6.2 peer-to-peer protocol and software that allows Decnet Phase IV networks to be managed from IBM's Netview, Interlink said.

While IBM will not directly sell the Interlink gear, Interlink Marketing Director George Saupe said IBM would be reference-selling the Interlink products at customer sites.

Interlink's barrage of software products are all aimed at merging the SNA and Decnet worlds together in a more cohesive fashion.

The offerings, scheduled to be released throughout 1989, include the following:

- SNS/Netconnect, a package that lets users manage Decnet networks via their existing IBM Netview screens. It supports various operating systems and will be priced at $97,900 for the initial release.

Continued on page 64

Tech day kicks off net show

BY PATRICIA KEEFE
CW STAFF

DALLAS — Novell, Inc. is expected to detail multiprotocol stack support under its Netware network operating system this week at Networld 88. This third annual gathering of Netware enthusiasts is slated to kick off today here at the Infomart.

Although the show officially runs Sept. 27-29, Novell is sponsoring a technology day today from 1 to 5 p.m. Overviews on Novell's financial and marketing strategies will be followed by a series of mini-sessions on the vendor's Universal Netware Architecture, Netware for the Macintosh, Netware for VMS, development tools and applications programming interfaces.

More than 200 exhibits and a total of 7,500 people have registered, an increase of nearly 1,000 over last year's total attendance of 6,600.

In case there is any doubt as to the theme of this show, 10 Novell booths — related to its different divisions, publications and users groups — should banish any uncertainty.

A whole raft of vendors will present new products, strategic directions and technology seminars at the show, including the following:

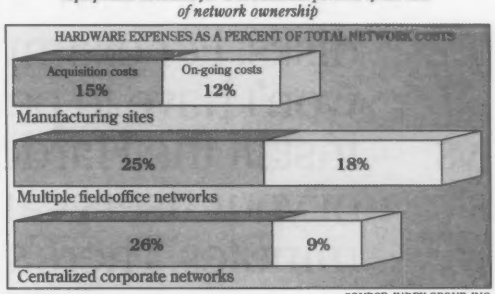
- In addition to its booth on the exhibit floor, IBM will sponsor a number of networking seminars in its suite at the Infomart. Session times will be displayed at

Continued on page 63

Data View

Network hardware

Equipment accounts for a substantial portion of the cost of network ownership



SOURCE: INDEX GROUP, INC.
CW CHART

9370 takes the Fastpath

BY PATRICIA KEEFE
CW STAFF

PHOENIX — IBM recently announced that it will expand the reach of its Enterprise System/9370 and 4381 mainframes into a multivendor environment by offering Intel Corp.'s Fastpath 9770 Connectivity Control Unit as an integrated feature.

The control unit reportedly will be available from both Intel and IBM at the end of November. Pricing is expected to start at $35,000.

Fastpath reportedly will provide an industry-standard open-bus architecture for all 370-class processors. The product was designed specifically to fit into the ES/9370's rack. The open-bus

Continued on page 68

Inside

- Vendors make systems reliability recommendations. Page 62.
- Datapoint unveils Netbios-compatible LAN. Page 63.
- Technical guides and aids for the asking. Page 68.

Who says you should invest $199* in ORACLE for your PC?

Who says you should invest $199* in the ORACLE relational DBMS? The experts do. As do the customers who have made Oracle Corporation the world's largest data management software and services company.

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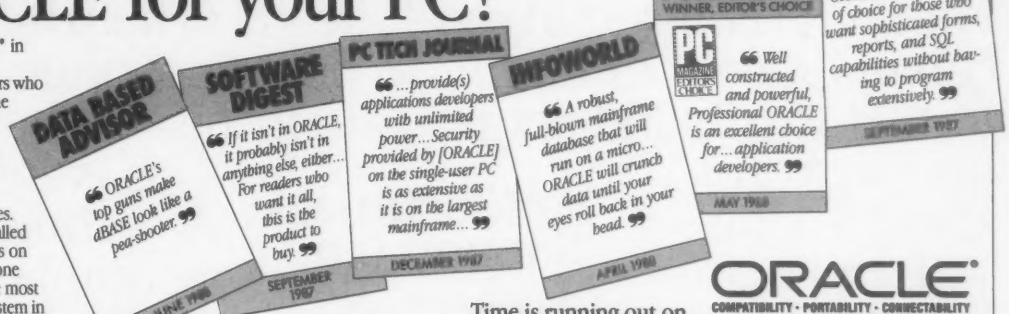

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Vendors offer system reliability pointers

BY PATRICIA KEEFE
CW STAFF

VAIL, Colo. — One positive outcome of the recent rash of software virus discoveries is a renewed interest in systems reliability.

Given that security issues are even more critical in a distributed environment, a handful of vendors got together here recently to hammer out some ground rules for ensuring systems reliability.

The payoff, according to the participants, is a more effective use of resources, more efficient business operations and more satisfied customers.

The two-day meeting held here two weeks ago also produced a set of recommendations for combating software viruses (CW, Sept. 19).

Participants included Datapoint Corp., Novell, Inc., ADI and Elgar Corp. Supporting organizations included Digital Equipment Corp., Alloy Computer Corp. and Proteon Corp. The meeting was organized and hosted by Delbert Jones, founder of the newly formed Washington, D.C.-based National LAN Laboratory.

The nonprofit lab reportedly will begin operations in January 1989. It will test and demonstrate computer products in real-life multivendor network environments.

The following draft recommendations are just that, as the group is not affiliated with any standard-making or user organizations. The extent to which any company might implement these strategies depends on its particular system configuration, resources and needs, according to Jones.

Reliability, according to Jones, can be achieved essentially by implementing a traditional systems management structure, including the following:

• **Analysis and planning.** This includes site and risk analysis and a disaster-recovery plan.

• **System administration.** An administrator should be assigned to every distributed system. The growing need for personnel trained in this area means that vendors and users must support development of effective training programs.

• **Power quality assurance.** Reliability problems stemming from poor electric power quality can be prevented easily and economically. Distributed systems require clean, computer-grade power instead of commercial-grade power. Servers, communications components and critical workstations should have battery backup at minimum and intelligent power protection if necessary. All network components need conditioned power.

• **Data disaster recovery planning.** Data backup and off-site storage should be an assigned task with continuing management supervision. Copies of all applications should be stored off-site in their original and user-configured versions. At minimum, there should be an incremental daily backup of system data, with complete system disk backups performed at a frequency determined by the necessity of the data and applications. Established procedures for test and verification of backup data are also encouraged.

• **Redundancy.** Any component whose failure will cause unacceptable downtime necessitates integration of an identical, redundant component into the system. Risk analysis can help determine the need for this fault-tolerant approach. Where downtime is not a critical issue, a policy for purchase and inventory of redundant components can provide cost-effective system reliability.

• **Distributed system management.** Ease of installation and use of distributed systems has fueled the myth that dispersed systems, especially personal computer ones, do not need management.

Computing is changing from several professionals managing a single computer to a single professional managing multiple computers in distributed environments.

Good News!

While . . .

IBM remains resolute

IBM says it is in the OS/2 Extended Edition game for the long haul and that the product will evolve in several ways over time.
• By mid-1989, it will be a full data base server under OS/2. And through an upgrade called Enhanced Communications Facility, it will act as a gateway to IBM's DB2 on the mainframe and the data on the System/36 and 38 family.
• By late 1989 or early 1990, the query manager will take full advantage of the OS/2 Presentation Manager interface.
• By 1990, Extended Edition and host data bases will communicate, allowing DB2 to extract data from Extended Edition. Transaction management will be handled by the data base queried, to ensure data integrity
• After 1990, multisite joins and two-phase commits for data security will become available. Also planned is the ability to have individual data base tables fragmented and located on different machines.

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Tech day

CONTINUED FROM PAGE 59

the booth.

• Northern Telecom, Inc. will discuss what it characterized as its emerging role in the personal computer local-area network market at a press briefing. Henry Theloosen, a Northern Telecom general manager, will be the keynote speaker at the trade show.

• LAN Systems, Inc. said it will announce what it claims is the first third-party-supplied value-added process (VAP) for Netware. Because it is implemented as a VAP, the Lanspool printer server program reportedly requires less random-access memory overhead than competing products. It allows users to attach multiple printers to any workstation running Netware Version 2.1.

Also set to debut is Version 2.0 of Referencepoint, a document management system for LANs and wide-area networks. This release is said to provide users with additional flexibility in categorizing documents and add reporting features for network managers.

• UK-based Madge Networks Ltd., a supplier of token-ring networks, is expected to preview a security program for token-ring LANs, as well as a bridge and repeater product.

• DSC Communications Corp., which last year purchased Nestar Systems, Inc., will introduce a new version of its NEX/OS network operating system written for use with the native mode of Intel Corp.'s 80386 microprocessor. Initially introduced in March, this version reportedly was designed to help users to fully exploit the power of a 386 chip.

• Harris Corp. will preview a PC LAN gateway that supports Ethernet and token-ring networks simultaneously, as well as an IBM 3270 super controller said to support networked PCs, 3270 coaxial A terminals and ASCII and Telnet devices.

• Eicon Technology Corp. is expected to display new bridging products that will support Netware Version 2.1.

• Brightwork Development, Inc. said it plans to introduce some products, unveil a strategic alliance and explain the results of its recent merger at a press conference scheduled for tomorrow.

• Another Ethernet adapter card will debut from IMC Networks. PCnic 8bit supports IBM Personal Computers and compatibles and rounds out a product family that includes 16-bit Ethernet cards and Personal System/2-compatible cards. PCnic 8bit is said to support multiple coaxial cable types, common Netware drivers for IBM PC AT and PS/2 versions. The product also requires a block of only eight I/O addresses but no on-board jumpers.

• Maynard Electronics Co. announced it will showcase the Maynstream 150, said to be the only internal 3½-in. backup system for IBM's PS/2 line, and the Maynstream 2200 HS, a 2.2G-byte helical-scan backup system.

Datapoint announces Netbios LAN

BY PATRICIA KEEFE
CW STAFF

DALLAS — One of the last holdouts, Datapoint Corp., a longtime supplier of proprietary networks, last week unveiled the Datalan PC, its entry into the IBM Netbios-compatible local-area network market. It will be demonstrated at Networld 88 here this week (see story, page 59).

Also introduced was a dedicated server and backup system for users with high-performance requirements. The software is said to run on a nondedicated server.

The network program is fully compatible with Microsoft Corp.'s MS-DOS, the IBM PC LAN Program and other Microsoft Networks-compatible network operating systems.

Datalan's network program reportedly uses the Netbios applications program interface and works with Ethernet, token-ring, Arcnet and any other LAN hardware that runs Netbios-based software.

Datapoint is trying to position the network as a compromise between the added value of proprietary products and the reliability or safety of industry-standard networks. The end result, the vendor claimed, is that users do not have to forego performance for standards compliance.

Although Datapoint uses Novell, Inc.'s Netware as an example of proprietary network software, Netware does support Netbios while running over Ethernet, token-ring and Arcnet hardware.

The Datapoint network can be configured for four, eight or more than eight users, with pricing set at $595, $1,195 and $1,995, respectively.

The optional high-speed dedicated server is said to support multitasking and features 32M bytes of cache memory and 12G bytes of disk memory. It costs $2,495. Backup facilities are offered through an unattended archival server said to support as much as 35G bytes of archival storage.

Also available is fault-tolerant technology that reportedly provides transparent critical-volume mirroring and conservation of usable disk space. This software costs $695.

Leong

FROM PAGE 59

come phrases that get lodged in the throat.

Pretty soon, E-mail will become such a tremendous crutch that users will be installing networks in their very homes. Picture workstations in every room of the house. Mother will E-mail the family when dinner is ready, while Dad will tell Junior the facts of life on an IBM Personal Computer AT with software he downloaded from the local bulletin board. From her bedroom terminal, Sis will tap into Dad's work computer and ask for shopping money.

People are so easily thrilled when they install their first network, all fired up with word processing groupware that lets individuals shoot off documents to each other electronically. This sure beats the agonizing hassle of walking those few yards to place on someone's desk an actual paper document with questions on yellow Post-it paper attached. Heaven forbid!

The executive buried behind her desk for 10 hours a day doesn't even have to walk outside the door to ask her secretary what her schedule is. She doesn't even have to bother with lifting up the telephone handset to make a call.

Ms. Mucky Muck simply needs to enter a few keystrokes on her personal computer to obtain her calendar on-screen. No muss, no fuss. She doesn't even need to stand up or speak.

Someone should see if there is a direct correlation between the number of people who attend aerobics classes and the number of local-area network nodes installed in large corporations. My guess is that there must be nearly a 1-to-1 ratio. With the decreased amount of physical activity needed at the workplace, those fat cells have to do something.

Corporations with networks have a responsibility to the nation. They have created employees with work habits that require only moving finger muscles. When people sit all day and go out for lunch to consume additional calories, top management should be concerned. Without a long-term vision from management, the efficient employees of today may become the heart-attack victims of tomorrow.

Sweat-log

I have a solution. Network managers should install programs that automatically log everyone out at the same time. The programs should order the entire company to go jogging around the premises. The terminals will not activate until employees dot their touch-sensitive screens with their own drops of sweat to show that they have completed their daily regimen. This method solves both the obesity and social delinquency problems.

Analysts predict that computer networks will be the fourth-largest growth area in terms of technology use at corporations. If you are an MIS director installing a new network, heed my advice, or your company will need to replace those Otis elevators with freight lifts.

Leong is *Computerworld*'s West Coast bureau chief.

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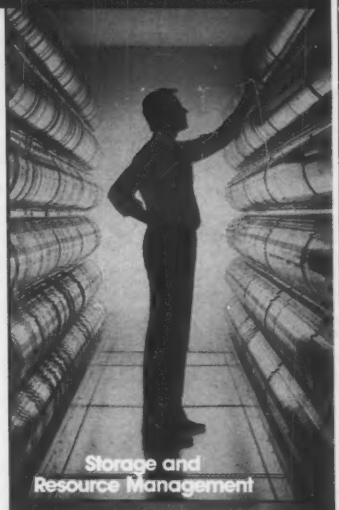

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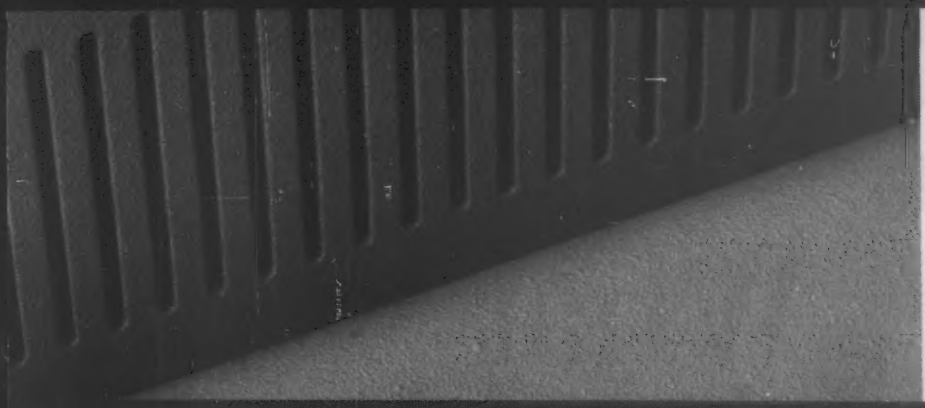
IBM

FROM PAGE 59

- SNS/Connect consists of a family of products that support the IBM VM, MVS and MVS/ESA environments. With SNS/Connect, IBM hosts look like DEC nodes to the Decnet operator and allow IBM and DEC users to transfer files and access records.
- SNS/SNA Gateway requires users to have an IBM 8232 LAN Channel Station Attachment, a front-end processor that supports the IBM 370 and 3090 series. The gateway includes an LU 6.2 interface for VAX/VMS, bidirectional file transfer, electronic mail and full-screen terminal emulation. Software will be priced at less than $100,000.
- SNS/SNApath allows remote Decnet network users to route Decnet packets over existing SNA lines. The network of DEC and IBM equipment will act as a single Decnet network.



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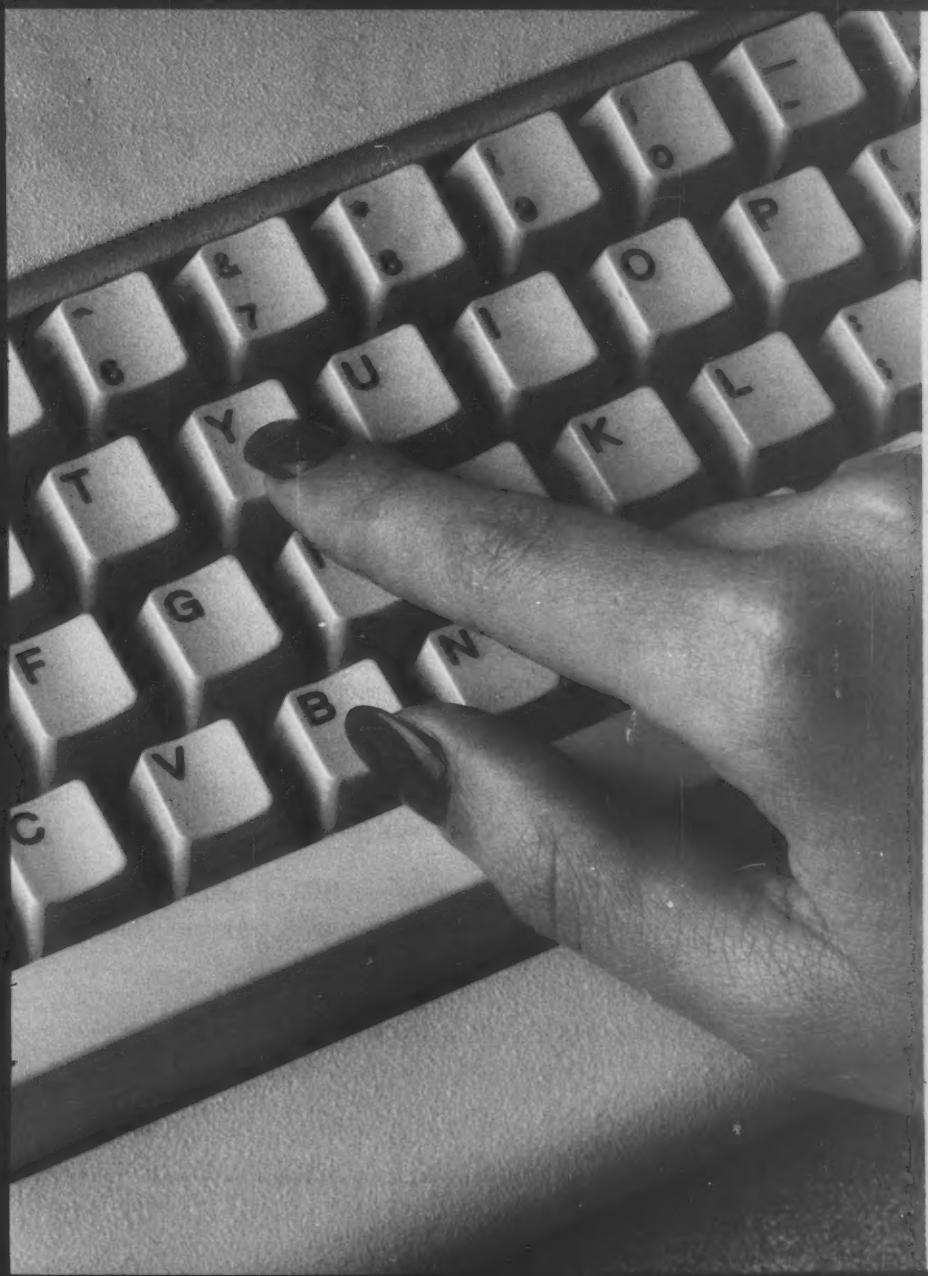

those irreplaceable facts and figures can also fall prey to power surges or blackouts, fire or water damage. What's more, statistics show that every system will eventually suffer a temporary hard disk failure. It's just a matter of time.

Strike a blow against unrecoverable data loss before it happens. Cipher offers a full range of internal and external tape drive systems for backup and interchange with virtually any computer system. Full and half-height 1/4" streaming cartridge, 1/2" cartridge and reel-to-reel tape systems. The latest optical disk drive technology. Plus a broad selection of subsystems and interfaces, including the new SCSI-2 technology.

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Most models of the IBM Application System/400 come rack-mounted like a stereo system. Components slide in and out, so you can upgrade right on the spot. You're not locked into any particular setup. Your system's only as big as you need, and making it bigger is easy.

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IBM® The Bigger Picture

Technical guides, aid abound

Network World and The Computer Channel, Inc. (CCI) will present a live, televised, interactive seminar on Integrated Services Digital Network on Oct. 21. For more information, call CCI at 516-352-9490.

Enterprise Systems, a business unit of Eastman Kodak Co.'s Software Systems Division, and **Systems Integration Specialists Co.** (Sisco) said they will jointly provide worldwide training for Sisco's MAP products, including sessions targeted specifically at Manufacturing Automation Protocol applications programmers.

Applied Learning has released **"Network Design and Management,"** an eight-tape videotape seminar that is said to explain how to integrate networks as an integral part of overall corporate strategy.

Produced in cooperation with James Martin, the series focuses on the issues, tools, techniques and human factors involved in designing and managing networks to achieve corporate goals. The videotape series require six hours to view and can be ordered by calling 312-369-3000. Rental costs range from $100 to $300 per month, depending on rental volume.

Ever mindful of user requirements to connect to the IBM world, **Apple Computer, Inc.** has devised "The Compatibility Guide" to the Macintosh and IBM Personal Computer and DOS-based PC connectivity. On a 5¼-in. PC disk, the guide should be available free of charge from Apple communications dealers this month. It reportedly details methods for integrating the two environments and makes recommendations for specific types of business needs. The product requires 512K bytes of random-access memory and an IBM Color Graphics Adapter-compatible monitor.

Buying a facsimile machine is not like buying an answering machine, warns a new publication, ***The Book of Fax: An Impartial Guide to Buying and Using Facsimile Equipment.*** The book reportedly helps users determine whether they need a fax and how to choose between a $300 and a $3,000 machine. It also addresses other issues, such as whether to lease or buy a fax and how to manage and integrate it into your office system. The 150-page book costs $12.95 and is available from computer dealers and bookstores.

Befuddled by all this talk about distributed processing and OS/2 hype? You might want to attend a joint seminar offered by Novell, Inc. and Oracle Corp. called **"The Issues and Answers: Distributed Data Management on Local and Remote Networks."** Of course, both vendors are hoping to sell their products in this area, but users are promised a tutorial on the ups and downs of distributed processing environments. The free seminars will be delivered at the Novell-sponsored Networld 88 trade show in Dallas this week; Oracle's International User Group Conference in Orlando, Fla., which is slated to run from Oct. 3-6; and at Comdex/Fall '88 in Las Vegas from Nov. 14-18.

Euromatica SA and **EDI, Spread the Word** have published the first international electronic data interchange (EDI) directory, called ***EDI Yellow Pages.*** Given that EDI cannot be done alone, the directory helps locate trading partners and suppliers. About 30 industries are said to have aggressive EDI programs under way. The guide reportedly boasts 5,000 listings representing more than 90% of the active EDI users. Only 1,500 users were listed 13 months ago.

More information is available from EDI, Spread the Word, 13805 Wooded Creek, #100, Dallas, Texas, 75244. 214-243-3456.

Fastpath

CONTINUED FROM PAGE 59

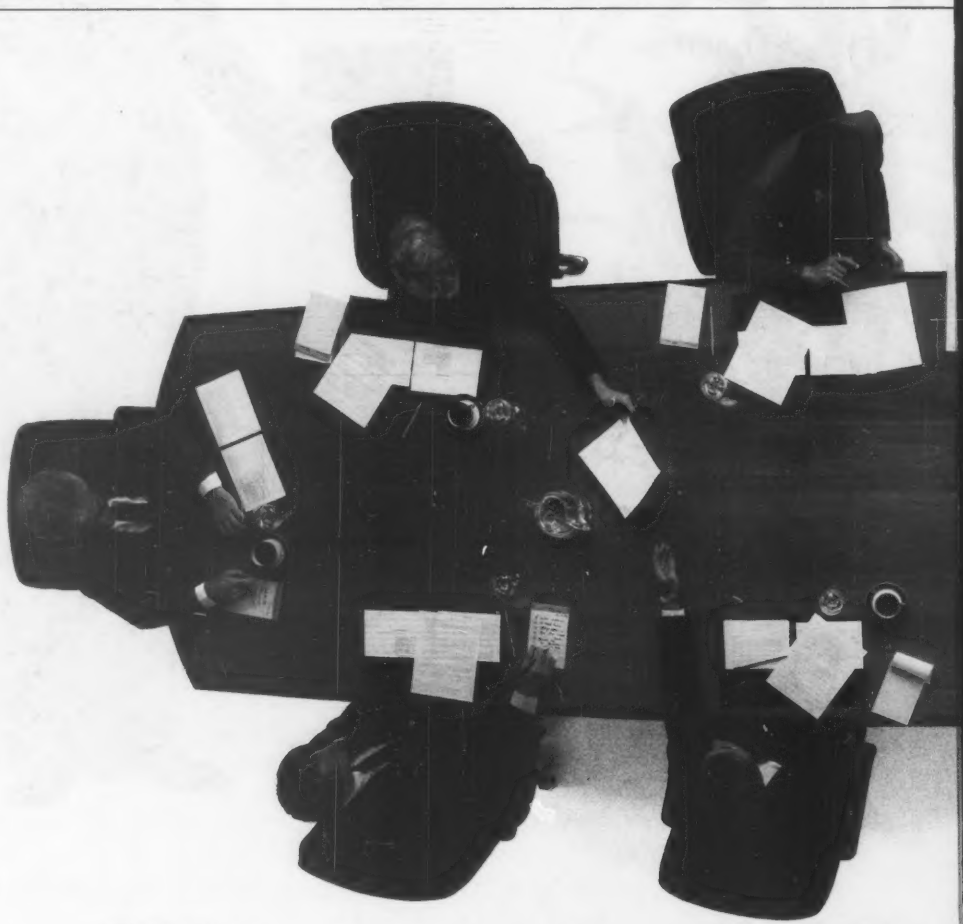
architecture is important because it will enable IBM's processors to connect to devices found in multivendor processor or networking environments, according to Intel.

Tie-ins

For example, a 370 machine that uses Fastpath can either tie into applications linking the data processing and engineering design environments or into devices used in process control and in laboratories.

Fastpath provides an IEEE 796 Multibus connection for 370-class processors. The channel-attach platform is said to support channel speeds as fast as 4.5M byte/sec. Among the connections supported by Fastpath 9770 are the following:

- ASCII devices for MUMPS under IBM's VM.
- Simultaneous high-speed connection for as many as four Digital Equipment Corp. VAXs or Sun Microsystems, Inc. Workstations III and IV for functions such as mail bridging, tape archiving and terminal emulation that use Flexlink International's Flexlink connectivity software.
- Networking capabilities to 802.3 Ethernet and 802.4 Token Bus for Transmission Control Protocol/Internet Protocol as well as Open Systems Interconnect networks.



What do you do when the

The business communications network you see above is a simple one. To make it work efficiently all you really have to do is speak, or pass along a sheet of paper.

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NEW PRODUCTS

Local-area networking hardware

Virtual Microsystems, Inc. has announced a personal computer add-in card that extends the functionality of a DOS application server for the Digital Equipment Corp. VAX machine.

Called **V-Server/Plus**, the applications server is a stand-alone hardware and software system that utilizes an IBM Personal Computer AT-compatible backplane. According to the vendor, the product can be configured for several standard implementations and can be used as a communications gateway, an office automation tool or a server for attached devices.

V-Server/Plus is priced from $500 to $2,000, depending on configuration. A baseline V-Server is priced from $12,000 for a four-user system.

Virtual Microsystems, Suite 700, 1825 S. Grant St., San Mateo, Calif. 94402. 415-573-9596.

Racore Computer Products, Inc. has introduced the **Lanpac II Repeater**, a product that was developed for use with the company's Lanpac II local-area network for IBM Personal Computer and compatible systems.

The repeater extends the distance between network nodes up to 10,000 feet and was designed to work with Lanpac II's proprietary polling system.

Each repeater comes with three I/O ports — one for the connection to the existing node and two for extension to other nodes.

The Lanpac II Repeater is being shipped in a stand-alone version with a price tag of $495; an internal card version for the PC bus is offered at a price of $395.

Additionally, the card plugs into an 8- or 16-bit I/O slot.

Racore Computer Products, 170 Knowles Drive, Los Gatos, Calif. 95030. 408-374-8290.

Local-area networking software

Alisa Systems, Inc. has started production shipments of its **Alisashare** file server for the Digital Equipment Corp. VAX/VMS environment.

The product is reportedly the only 100% Apple Computer, Inc. Appletalk Filing Protocol-compatible file server currently available for the VMS market. Alisashare is a component of Alisatalk, which provides VAX/VMS file service, print spooling and network virtual terminal services to Apple Macintosh users connected to an Appletalk network.

Alisashare is an upgrade to the company's existing file server. According to the vendor, it is being shipped to Alisa customers at no charge. Pricing ranges from $4,700 to $14,400.

Alisa, Suite 175, 221 E. Walnut St., Pasadena, Calif. 91101. 818-792-9474.

Data Access Corp. has announced a productivity software program targeted at the corporate microcomputer users in a local-area network environment.

Office Works consists of five independent modules and offers support of phone messaging, document control, name and address database maintainance, electronic mail and time-scheduling functions. The software runs on IBM Personal Computers or compatible systems with 640K bytes of random-access memory. Multiuser-compatible operating systems reportedly include Novell, Inc.

Advanced Netware Version 2.0 and higher, 3Com Corp. 3+ Version 1.1 and higher, IBM Token-Ring/LAN Program Version 1.12 and other Netbios-compatible networks.

According to the vendor, the LAN version of Office Works is priced at $1,395. A single-user version is available for $195.

Data Access, 14000 W. 119th Ave., Miami, Fla. 33186. 305-238-0012.

Network management

NCR Comten, Inc., a subsidiary of **NCR Corp.**, has introduced another version of the **Comten 3695** communications processor. The Comten 3695 is a single-bay system that is said to include 1M byte of memory and offer support for 16 half- or full-duplex 9.6K bit/sec. communications lines. The product supports IBM and IBM-compatible mainframes and systems capable of supporting IBM Binary Synchronous Communications 3270 devices.

The Comten 3695 costs from $60,000 to $741,000.

NCR Comten, 2700 Snelling Ave. N., St. Paul, Minn. 55113. 612-638-8685.

An asynchronous line monitor has been introduced by **Mitsui & Co. USA.**

Called the **Bits HM-2 RS232C Asynchronous Line Monitor**, the unit was designed for simultaneous, bidirectional monitoring.

The product features nine line speeds ranging from 75 to 19.2K bit/sec., the vendor said, and includes a built-in printer interface and an audio/visual error signal. The monitor can be used for debugging communications lines or for software development.

The HM-2 RS232C Asynchronous Line Monitor costs $1,100.

Mitsui & Co., 200 Public Sq., Cleveland, Ohio 44114. 216-696-8710.

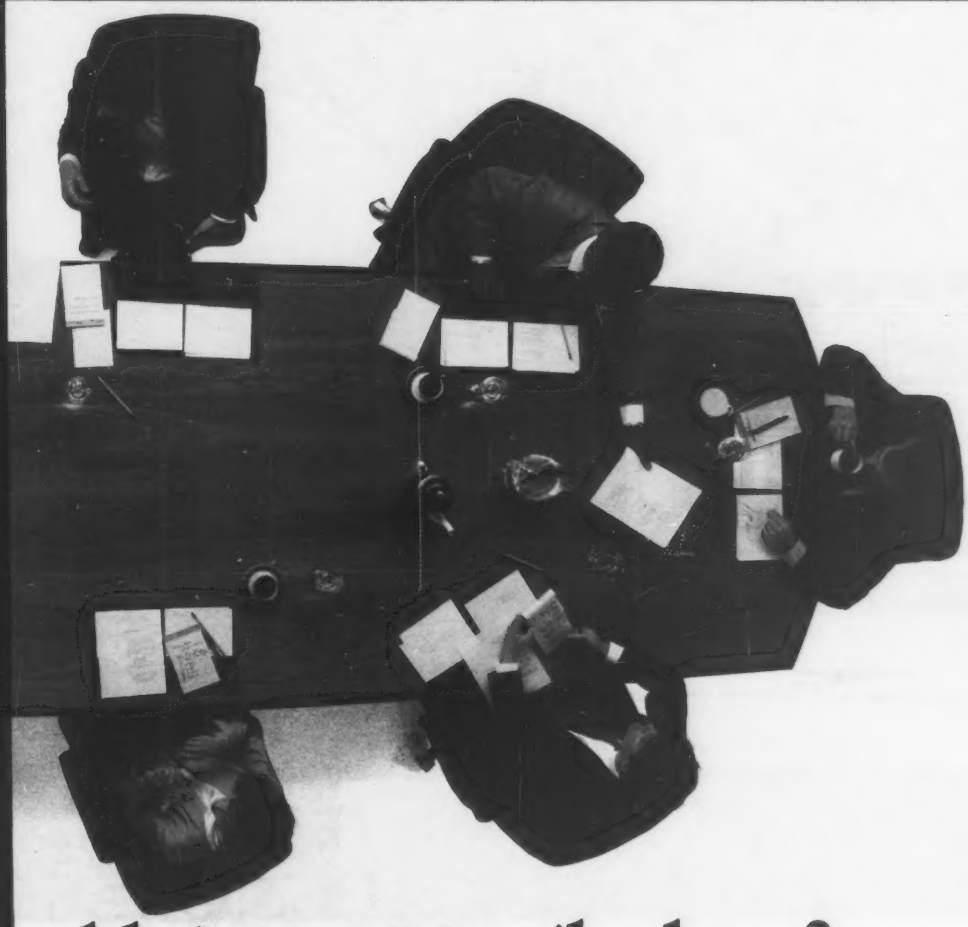

table is 12,000 miles long?

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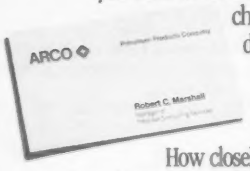
MIS manager buys M

Although we'd be quite pleased to have you replace every PC you own with Macintosh® computers, the introduction of our machines into a DOS office does not require any such drastic measures.



Because, and we'll say it flat out, Macintosh runs MS-DOS. Macintosh reads MS-DOS. And Macintosh shares data with MS-DOS computers.

How closely a Macintosh works with your PCs depends on what you actually need. Because Macintosh can be configured for almost any degree of compatibility. From easy speaking terms to an intimate working relationship.

If you need to run DOS programs such as 1-2-3 and dBase III, there are several easy ways to do that. One is the AST Mac286 card. Which you simply plug into a slot in the Macintosh II for AT-type performance. Or, if you prefer not even to lift a screwdriver, SoftPC is a software program that lets you run both DOS and Macintosh applications at the same time.

After closer analysis, however, you may find that the kind of compatibility that's really important is the ability to share information effortlessly between computers. Particularly if you have years of accumulated data stored away on PCs.

Here the Macintosh concept of workgroup computing proves itself in practice. In fact, you may find it easier to network Macintosh computers with PCs than to network PCs by themselves.

Two examples of that are Novell Netware for Macintosh and our own AppleShare® and AppleShare PC file server software.

With these systems in place, you can move data back and forth without complications. Files created on Word or WordPerfect are

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Macintosh, keeps PCs.

translated to their Macintosh counterparts with formatting intact. Crossing the border is equally easy when you transfer data between 1-2-3 and Excel for Macintosh.

If you don't choose to network, there are other simple ways for Macintosh and PCs to communicate. One is DaynaFile, a Macintosh disk drive system that reads data directly off any of the several DOS disk formats. Another is MacLinkPlus, a cable and software system for sharing data between two computers.

But no matter where the information originates, or how it's transferred, once on the Macintosh, this computer's unique power to analyze, enhance, and graphically communicate that information is unmatched. Which is one reason Macintosh is moving into formerly DOS-exclusive realms in such great numbers.

And unique Macintosh tools like HyperCard® software are another reason. With HyperCard, you can organize and retrieve data in a way that's akin to the mind's own workings: free association.

HyperCard, because it's modular and easy to customize, can be distributed in graphical template form. Giving people not comfortable with DOS databases a more natural way to get at vital business information and store their own data.

Meanwhile, we'll give you a natural way to get at vital Macintosh information. Simply call us toll-free at 800-446-3000, ext. 400, for the name of your nearest authorized Apple® reseller.

We'll show you how harmoniously and productively Macintosh can work with any PC work force. Without massive layoffs.

The power to be your best.™

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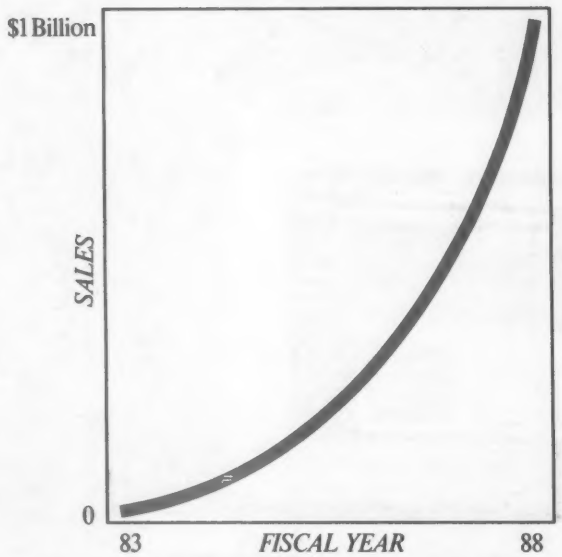
It pays to be open.



During the past year we delivered $1 billion worth of Sun computers and services.

Gratifying enough for a company that's just six years old.

But what's more, those sales confirm a broad acceptance of the whole idea behind Sun.

The Open Systems idea.

Systems based on standards so universally accepted that they allow combinations of hardware and software from literally thousands of independent vendors. Standards such as the UNIX® Operating System, SPARC™ processors, NFS™ networking software, and the OPEN LOOK™ user interface.

So for the first time, you're no longer locked into the company who made your computers. Even if it's us.

Not that we're concerned.

In a free market, the best products win out. And nobody but Sun offers such powerful and cost-effective distributed computing solutions. Solutions based on state-of-the-art workstations, servers, and networking software.

A Sun workstation moves data many times faster than a PC, and its graphics are stunningly better. A Sun server is as powerful as a supermini, but at a fraction of the cost. And Sun's networking software provides the entire system with an unmatched ability to talk to any kind of computer. Transparently. Effortlessly. Desk to desk. Desk to mini. Desk to mainframe.

Even continent to continent.

It was our vision that this kind of distributed computing could bring unprecedented power not only to the individual, but to the workgroup, and the entire company—in ways that PCs, minis and mainframes never could. Power to access, share, and work with information to a greater degree than ever before.

That is the very reason Sun's Open Systems are at work today throughout all industries. From finance to semiconductors, automotive to aviation. At the largest and smallest corporations in the world, all over the world.

These companies saw the future the same way we did.

Wide open.

sun microsystems

The Network *Is* The Computer™

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Temporary glue or long-term alternative?

BY MICHAEL HURWICZ

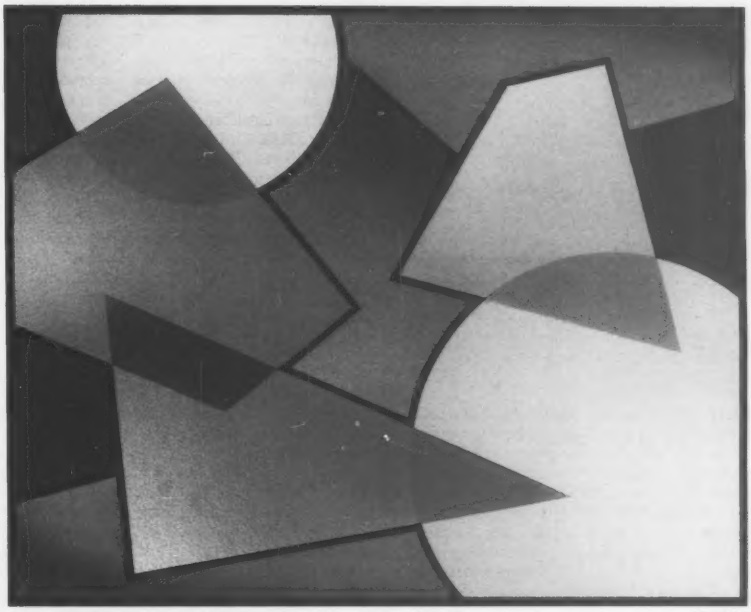
OSI may eventually rule the seas of multivendor networking. But for the time being, users who can't stay in the safe harbor of a proprietary networking scheme like Systems Network Architecture (SNA) or Decnet are mainly choosing to sail around the dangers of systems incompatibility under the flag of TCP/IP.

TCP/IP, or Transmission Control Protocol/Internet Protocol, is a suite of protocols for the internetworking of multivendor systems. Originally developed by academic researchers for use in the U.S. Department of Defense Advanced Research Projects Agency Network (DARPA), TCP/IP has been quietly gaining adherents in government agencies and academic institutions for close to 20 years. Only recently has the TCP/IP option for interoperability begun to capture the hearts and minds of information systems managers in business and industry.

TCP/IP may be an old set of protocols, the reasoning goes, but it is still serviceable. Besides, the building, testing and launching of a full set of Open Systems Interconnect (OSI) protocols could take years, and some voyagers just cannot afford to wait.

The Summer Olympics, for example, were going to come off on schedule in Seoul, South Korea, whether or not NBC, the television network that had acquired official broadcast rights, found a smooth way to coordinate its behind-the-scenes communications.

A personal computer Ethernet local-area network with IBM Personal System/2 Model 30s was chosen as the most affordable and adaptable vehicle for a variety of tasks — such as scripting, logistics, personnel tracking and accounting — that covering a complex event like the Olympics requires.



DAVE JOLY

INSIDE

Routes across the TCP/IP-OSI divide
Page 80

How to recognize sub-standard performance
Page 88

Breaks in the vacuum of network management
Page 91

However, one critical task — hooking into an on-line library to supply broadcasters with ready access to current performance results, biographies and statistics on athletes and information about previous competitions — could not be handled on a micro LAN. So Princeton, N.J.-based Nesbit Systems, Inc., the consulting firm that had been awarded the contract to implement NBC's Olympics network, instead decided to put the application on a Digital Equipment Corp. Microvax running CP International, Inc.'s Status text-retrieval software. But this choice meant that a means of integrating that equipment with the planned LAN had to be found.

Nesbit Systems solved the problem by installing TCP/IP-based terminal-emulation software from Polygon, Inc. on those LAN workstations that needed access to the Microvax-based research library.

The gateway from the Novell, Inc. Netware LAN to the Microvax was implemented using Micom-Interlan, Inc.'s TCP/IP gateway hardware and software and additional software from Polygon to make the connection more seamless and to allow users to hot-key between DOS and Microvax applications. "TCP/IP was the only choice," says Irene Nesbit, president of Nesbit Systems.

Market analysts confirm an explosion of TCP/IP in business

Hurwicz is president of the MTI Group, a data communications consulting firm in Nashville.

Alternative?

FROM PREVIOUS PAGE

environments. For instance, Infonetics, Inc., a Santa Clara, Calif., consulting and market research firm, recently surveyed 300 current and potential users of TCP/IP equipment. The study showed that TCP/IP use will grow dramatically during the next two to three years and will continue to grow into the 1990s, although at a slower rate.

Most of that growth will be in the commercial segment, rather than in government or academic environments. In 1987 in the U.S., according to Infonetics' figures, 22% of the TCP/IP market went to private businesses, 67% to government agencies and 11% to academic institutions.

In 1991, Infonetics indicates, business will gobble up 57% of TCP/IP products that will be sold, leaving only 36% for the government and 7% for the schools.

Several reasons account for the upsurge in the commercial sector, according to Michael Howard, executive vice-president and senior analyst for internetworking at Infonetics. There are, he says, millions of PCs in the commercial sector. Many have already been connected via LANs, and more will be connected during the next few years.

Once organizations get a taste of the added productivity achievable through work group-level connections, Howard says, they begin to want more and different kinds of access; they want to be able to reach and use information residing on mainframes, minis and other LANs.

While internetworking can be accomplished with DEC's Decnet or IBM's SNA, Howard says, for a lot of companies with mixed vendor environments this is not a possibility. The only way to tie PC LANs and other machines together is with TCP/IP. OSI is not here yet, so people are buying TCP/IP. "That is what is really propelling TCP/IP in the commercial sector," Howard maintains.

A report published this year by the Elliott City, Md.-based Newton-Evans Research Co. also forecasts substantial growth for business use of TCP/IP, although the assumed rate of growth is lower than that projected by Infonetics.

In 1991, Newton-Evans foresees that business and industry will account for 25% of the dollars spent on TCP/IP hardware, software and services. This represents a 10% increase over the firm's current estimate of that sector's involvement but would only bring it even with academia at half the level of government spending.

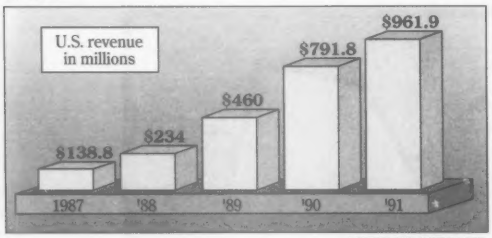
Steve Papermaster, president of Business Systems Group, Inc., a national systems consulting firm based in Houston, says he has seen a great increase in the acceptance of TCP/IP on micro LANs among his Fortune 1,000 customers in the last three or four months.

"We have passed the evaluation wait-and-see period," Papermaster says. "We will see a great deal more TCP/IP on microcomputer LANs in coming years." He adds that many companies start using TCP/IP in the engineering department, or for some other specialized use, and

Continued on page 78

Popularity index

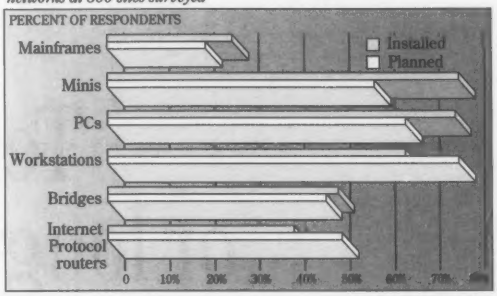
U.S. sales of TCP/IP products are projected to total almost $1 billion in 1991



SOURCE: INFONETICS, INC.
CW CHART

Network population

Equipment installed and slated for purchase as part of TCP/IP networks at 300 sites surveyed



SOURCE: INFONETICS, INC.
CW CHART

Defining the subject

internet/Internet: When written in lowercase, internet refers to a collection of packet-switching networks interconnected by gateways along with protocols that allow them to function logically as a single, large virtual network. When written in uppercase, Internet refers to the DARPA Internet and the TCP/IP protocols it uses.

Transmission Control Protocol (TCP): The Internet standard transport-level protocol that provides the reliable, full-duplex stream service on which many application protocols depend. TCP allows a process on one machine to send a stream of data to a process on another.

Internet Protocol (IP): The Internet standard protocol that defines the Internet datagram as the unit of information passed across the Internet and provides the basis for the Internet connectionless, best-effort packet delivery service. IP includes a control and error message protocol as an integral part.

FINER POINTS

Address mask: A bit mask used to select bits from an Internet address for subnet addressing. The mask is 32 bits long and selects the network portion of the Internet address and one or more bits of the local portion.

Address resolution: Conversion of an Internet address into a corresponding physical address. Depending on the underlying network, resolution may require broadcasting on a local network.

Address Resolution Protocol (ARP): The Internet protocol used to dynamically bind a high-level Internet address to a low-level physical hardware address. ARP is only used across a single physical network and is limited to networks that support hardware broadcast (see Broadcast).

Bridge: A router that connects two or more networks and forwards packets among them. Usually, bridges operate at the physical level. Bridges differ from repeaters because bridges store and forward complete packets, while repeaters forward electrical signals.

Broadcast: A packet delivery system that delivers a copy of a given packet to all hosts that attach to it is said to broadcast the packet.

Connectionless service: Characteristic of the packet delivery service offered by most hardware and by the Internet protocol. The connectionless service treats each packet or datagram as a separate entity that contains the source and destination address.

Datagram: The basic unit of information passed across the Internet. An IP datagram is to the Internet as a hardware packet is to a physical network. It contains a source and destination address, along with data.

Exterior Gateway Protocol (EGP): The protocol used by a gateway in one autonomous system to advertise the Internet addresses of networks in that autonomous system to a gateway in another autonomous system.

File Transfer Protocol (FTP): The Internet standard, high-level protocol for transferring files from one machine to another. Usually implemented as application-level programs, FTP uses the Telnet (see Telnet) and TCP protocols.

Gateway-to-Gateway Protocol (GGP): The protocol that core gateways use to exchange routing information, GGP implements a distributed shortest path routing computation.

Hierarchical routing: Routing that is based on a hierarchical addressing scheme. Most Internet routing is based on a two-level hierarchy in which an Internet address is divided into a network portion and a host portion.

Hop count: A measure of distance between two points in the Internet. A hop count of *n* means that *n* gateways separate the source and destination.

Internet Control Message Protocol (ICMP): An integral part of the Internet Protocol that handles error and control messages. Specifically, gateways and hosts use ICMP to send reports of problems about datagrams back to the original source. ICMP also includes an echo request/reply, which is used to test whether a destination is reachable and responding.

Interoperability: The ability of software and hardware on multiple machines from multiple vendors to communicate meaningfully.

Packet Inter Net Groper (PING): The name of a program used in the Internet to test reachability of destinations by sending them an ICMP echo request and waiting for a reply. The term has survived the original program and is now used as a verb, as in "Please ping host A to see if it is alive."

Simple Mail Transfer Protocol (SMTP): The Internet standard protocol for transferring E-mail messages from one machine to another. SMTP specifies how two mail systems interact and the format of control messages they exchange to transfer mail.

Subnet address: An extension of the Internet addressing scheme that allows a site to use a single Internet address for multiple physical networks.

Telnet: The Internet standard protocol for remote terminal connection service. Telnet lets a user interact with a remote time-sharing system at another site as if the user's terminal connected directly to the remote machine.

Trivial File Transfer Protocol (TFTP): The Internet standard protocol for file transfer with minimal capability and minimal overhead.

TP-4/IP: A term often given to the International Standards Organization (ISO) protocol suite that resembles TCP/IP. Both the Internet TCP and ISO TP-4 protocols provide reliable stream delivery service using basically the same techniques of positive acknowledgment and retransmission. Internet is slated to move to TP-4 when viable.

User Datagram Protocol (UDP): The Internet standard protocol that allows an application program on one machine to send a datagram to an application program on another machine. Conceptually, the important difference between UDP and IP is that UDP messages include a protocol port number, allowing the sender to distinguish among multiple destinations (application programs) on the remote machine.

DOUGLAS COMER

Excerpted and adapted with permission from *Internetworking with TCP/IP: Principles, Protocols and Architecture* by Douglas Comer (Prentice-Hall, Inc., 1988).

HOW MANY CHECKS WILL IT TAKE TO NETWORK YOUR ENTIRE COMPANY?

AS MANY CHECKS

MAINFRAMES

Amdahl
- 5890
  - Model 180E
  - Model 190
  - Model 190E
  - Model 200
  - Model 200E
  - Model 300
  - Model 300E
  - Model 390E
  - Model 400E
  - Model 600E
- 5990
  - Model 700
  - Model 1400

Control Data
- Cyber 900 Family
  - Cyber 930
  - Cyber 960
  - Cyber 990

Cray
- Cray Supercomputers
  - Cray-2
  - Cray X-MP
  - Cray Y-MP

Hitachi
- L Series
  - L 450
  - L 470
- M Series
  - M 220
  - M 240
  - M 630
  - M 640
  - M 660
  - M 680

Honeywell Bull
- DPS 7000 Series
  - 7000/10
  - 7000/20
- 7000/30
- 7000/40
- 7000/50
- 7000/72
- 7000/82
- 7000/92
- DPS 8
  - 52
  - 62
  - 70
- DPS 8000 Series
  - 8000/41
  - 8000/81
  - 8000/82
  - 8000/83
  - 8000/84
- DPS 88 Series
  - 41
  - 42
  - 81
  - 82
  - 861
  - 862
  - 891
  - 892
- DPS 90 Series
  - 91
  - 92
  - 93
  - 94

IBM
- 370 Family
- 308X Family
- 3090 Family
  - 3090 Model 120E
  - 3090 Model 150E
  - 3090 Model 180E
  - 3090 Model 200E
  - 3090 Model 300E
  - 3090 Model 400E
  - 3090 Model 600E
- 4381 Family
  - 4381 Model Group 11
  - 4381 Model Group 12
  - 4381 Model Group 13
  - 4381 Model Group 14
  - 4381 Model Group 21
  - 4381 Model Group 22
  - 4381 Model Group 23
  - 4381 Model Group 24
- 5360 System Unit
- 5362 System Unit
- 5363 System Unit
- 9370 Family
  - 9373 Model 20
  - 9375 Model 40
  - 9375 Model 60
  - 9375 Model 90

NAS
- NAS AS/VL Series
  - AS/VL 40
  - AS/VL 50
  - AS/VL 60
  - AS/VL 80
- NAS AS/XL Series
  - AS/XL 50
  - AS/XL 60
  - AS/XL 70
  - AS/XL 80
  - AS/XL 90
  - AS/XL 100

NCR
- NCR I Series
  - I-9400
  - I-9500
- NCR V Series
  - V-8600 Series
  - V-8800 Series
- NCR System 10000 Family
  - Model 35
  - Model 55
  - Model 65
- Model 75
- NCR 9800 Series
  - 9811
  - 9821
  - 9822
  - 9832
  - 9842
  - 9848
  - 9863

Nixdorf
- 8890

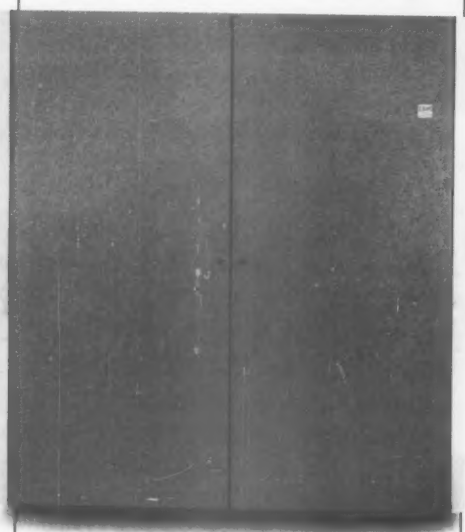
Sicontrol
- 7000

Tandem
- VLX

Unisys

Sperry
- 1100 Family
  - 1100/91
  - 1100/92
  - 1100/93
  - 1100/94
  - 1100/71
  - 1100/72
  - 1100/73
  - 1100/74
- 2200 Family
  - 2200/201
  - 2200/202
  - 2200/203
  - 2200/204
  - 2200/401
  - 2200/402
  - 2200/403
  - 2200/404

Burroughs
- A Series
  - A1
  - A2
  - A3
  - A4



PERSONAL COMPUTERS, WORKSTATIONS & TERMINALS

3Com
- 3Station

ACER
- ACER 710
- ACER 900
- ACER 700VT2
- ACER 910
- ACER 1100
- ACER 1100

Akkord
- XTRA Pro. Series 300 Workstation
- XTRA Pro. Series 400 Workstation
- XTRA Pro. Series 700 Workstation

Altos
- 3068
- 686
- 886
- 1086
- 2086
- Series 1000
- Series 2000
- Series 500

AMDEK
- System/88
- System/286
- System/286A
- System/386
- System/386E

Amstrad
- PPC 512
- PPC 640
- PC 1512
- PC 1640

Apollo
- DN 10000 Series
- DN 300 Series
  - DN 300
  - DN 320
  - DN 330
- DN 3000 Series
  - DN 3000
  - DN 3010
  - DN 3050
- DN 400 Series
  - DN 400
  - DN 420
  - DN 460
- DN 4000 Series
- DN 5XX Series
  - DN 550
  - DN 560
  - DN 570
  - DN 570 Turbo
  - DN 580
  - DN 580 Turbo
  - DN 590
  - DN 590 Turbo
- DN 600 Series
  - DN 600
  - DN 660
- DSP-80
- DSP-90

Apple
- Macintosh 512
- Macintosh 512K E
- Macintosh Plus
- Macintosh SE
- Macintosh II

AST
- Premium/286
- Premium/386
- Premium Workstation
  - Model 200
  - Model 203
  - Model 205
  - Model 243

AT&T
- 6286 WGS
- 6300 WGS
- 6300 + WGS
- 6312 WGS
- 6386 WGS
- 6386E WGS

Bustec/Ireland
- Wyse 386
- Wyse 286

Caseta
- A-2000SX
- A-2000EX II
- A-200 III

Compaq
- Deskpro 286
- Deskpro 386
- Deskpro 386/20
- Deskpro 386/25

Computerland
- BC88
- BC286

Computervision
- 30M
- 32
- 33
- 34

Cordata
- ATD Series
- ATP Series
- CS 45
- CS 4200
  - CS 4205
  - CS 4210
  - CS 4220
- CS 5000 Series
  - CS 5005
  - CS 5040
  - CS 5080
- WPC
- WPC Bridge

Data General
- Dasher/286
- DG/One Model 2T

Datavue
- DV 2502
- DV 2503
- DV 2504
- DV 2300 Series
  - DV 2S-2302PL
  - DV 2S-2303PL
  - DV 2S-2304PL
- DV 2400 Series
  - DV 2S-2402
  - DV 2S-2403
  - DV 2S-2404
- Snap I + I
  - Model 01
  - Model 01EL
  - Model 01GL
- Spark
  - Model 3841
  - Model 3842
  - Model 6401
  - Model 6402

Dell
- PC's Limited Turbo
- Dell System 200
- Dell System 220
- Dell System 310

Digital Equipment Corp.
- VAXmate
- PC500
- Model 1253
- Model 1263

GRiDCase EXP
- Model 1255
- Model 1265
- GRiDLite
- GRiDLite Plus
- GRiDCase 1520
- GRiDCase 1530

Epson
- Equity I +
- Equity II +
- Equity LT
- Equity III +

Ericsson
- See Nokia Data

Esprit
- Esprit I
- Esprit II
- Esprit III
- Esprit 6000 Series
- Esprit Opus 3in1

Everex
- Step 80286
  - 286/12
  - 286/16
- Step 80386
  - 386/16
  - 386/20

Franklin
- PC-6000
- PC-8000

Gold
- GRiDCase 2,3
  - Model 1250
  - Model 1252
  - Model 1260
- GRiDCase Plus 2,3

Hewlett-Packard
- HP 250X
- HP Vectra
  - Model 25
  - Model 45
  - Model 50
  - Model 60
- HP Portable Plus
  - Model 4577HP
  - Model 4577HE
- HP Portable Vectra CS
  - Vectra CS
  - Vectra CS Model 20
- HP Vectra CS PC
  - Model 10
  - Model 11
  - Model 12
  - Model 20
- HP Vectra ES PC
  - Model 10
  - Model 20
  - Model 21
  - Model 22
- HP Vectra ES/12 PC
  - Model 10
  - Model 20
  - Model 40
- HP Vectra RS/16 PC
- Model 40
- HP Vectra RS/20 PC
- Model 40
- Model 100
- Model 150
- Model 300

Honeywell Bull
- PC AP-X Series
- PC XP Series
- PC SP Series

Hyundai
- Super-16T
- Super-286
- Super-286C

IBM
- PC Convertible
- PC XT
- PC AT
- PC
- PC XT 286
- PS/2 Model 25
- PS/2 Model 30
- PS/2 Model 50
- PS/2 Model 60
- PS/2 Model 70
- PS/2 Model 80
- 3151 ASCII Display Station
- 3161 ASCII Display Station
- 3162 ASCII Display Station
- 3163 ASCII Display Station
- 3164 ASCII Display Station

Intergraph
- InterPro
- InterAct
- InterView

Kaypro
- Kaypro Micro 1
- Kaypro PC
  - Kaypro PC-30
  - Kaypro 286
  - Kaypro 286i
  - Model A
  - Model C
- Kaypro 286-16
- Kaypro 386 Series
  - Model A
  - Model E-40
- Kaypro 2000 +

Leading Edge
- Leading Edge PC, Model D
- Leading Edge PC, Model D2
- Leading Edge Model MH

Milnc
- Paragon 88
- Paragon 286
- Paragon 286S
- Paragon 286SV
- Paragon 286VE
- Paragon 386
- Paragon 386E

Mitsubishi
- MP 286 Series
  - Model 310
  - Model 320
  - Model 340
- MP 386

NCR
- PC5
- PC710
- PC810
- PC916
- 3390
- 3392

NEC
- PowerMate I
  - H200-1B
  - H201-1B
  - H202-1B
  - H203-1B
- PowerMate 2
  - Model H500B
  - Model H501B
  - Model H502B
  - Model H503B
- PowerMate 386
  - Model H600B
  - Model H601B
  - Model H602B
  - Model H603B
- PowerMate 386/20
  - H601E-1B
  - H603E-1B
  - H605E-1B
  - H606E-1B
- PowerMate Portable
  - APC-H701
  - APC-H702

MultiSpeed
- MultiSpeed EL
- MultiSpeed HD

Nokia Data
- Nokia PC286
- Nokia WS286
- Nokia TT/286
- Nokia WS386
- Nokia TT/386

Olivetti
- M280
- M240
- M250
- M290
- M380 Family
- M380XP Family

PC's Limited
- See Dell
- PC's Limited 286

Samsung
- S300
- S500
- S5000
- S5100

Sharp
- PC-4500 Series
  - Model 4501
  - Model 4502
  - Model 4521
- PC-7000A/7000 Series
  - Model 7000A
  - Model 7100
- PC-7200 Series
  - Model 7202
  - Model 7221
  - Model 7241

Sun
- Sun 4/100 Family
- Sun 4/200 Family
- Sun 3/50
- Sun 3/60
- Sun 3/100 Family
- Sun 3/200 Family
- Sun386i Family

Tandon
- PCX
  - Model PCX-2
  - Model PCX-20
- PCA
  - Model PCA-1
  - Model PCA-20
  - Model PCA-40
  - Model PCA-70
- PCA Plus
  - Model PCA-20 Plus
  - Model PCA-40 Plus
  - Model PCA-70 Plus
- Targa
  - Targa 20
  - Targa 40
- Targa Plus
  - Targa 20 Plus
  - Targa 40 Plus
- PAC 286
- PAC 286 Plus
- 386

Tandy
- Color Computer 3
- Model 4D
- Model 102
- Model 1000HX
- Model 1000TX
- Model 1400LT
- Model 3000
- Model 3000HL
- Model 4000

Tulong
- TCS-4000
- TCS-7000
- TCS-8000

TeleVideo
- Telecat 286
  - Model FL
  - Model 101
  - Model 40
  - Model ND
- Teler/386
  - Model NH
  - Model 40
- TeleOAS I
- TeleOAS II
  - Model NH
  - Model 20
- TeleOAS III
  - Model NH
  - Model 40
  - Model 70
- TeleOAS III/20
  - Model NH
  - Model 40
  - Model 70
- TeleVideo 9xx Family

Texas Instruments
- Business Pro

Toshiba
- T1000
- T1100 Plus
- T1200
- T3100/20
- T3200
- T5100

Unisys
- PW2
- Series 300
- Series 500
- Series 800
- 800/16
- 800/20
- Series 850

Victor Technologies
- VPS IIC
  - 2691M-1
  - 2692M-1
  - 2693C-1
- VPC 256
  - 2721M-1
  - 2721C-1
  - 2722M-1
  - 2722C-1

Wang
- Laptop Cc..mputer
- PC 240
  - PC 240-1
  - PC 240-2
  - PC 240-3
- PC 280
  - Model PC 280-1
  - Model PC 280-2
  - Model PC 280-3
- PC 380
  - Model PC 380-1
  - Model PC 380-2
  - Model PC 380-3

Wyse
- PC 286 Model 2108
- PC 286 Model 2112
- PC 286 Model 2200
- PC 286 Model 2214
- PC 386 Model 3216
- Wyse 30
- Wyse 50
- Wyse 60

Zenith
- Z-159
  - Model 2
  - Model 3
  - Model 12
  - Model 13
- Z-248
  - ZF-248-81
  - ZF-248-82
  - ZF-248-84
- Z-286
  - ZF-286-02
  - ZF-286-23
  - ZF-286-25
- Z-386
  - Model 40
  - Model 80

MINICOMPUTERS

AT&T
- 3B Series

Data General
- ECLIPSE MV/Family
  - MV/1400 DC
  - MV/2000 DC
  - MV/7800 DCX
  - MV/2000 DC
  - MV/7800 XP
  - MV/15000
    - Model 8
    - Model 10
    - Model 20
  - MV/20000
    - Model 1
    - Model 2

Digital Equipment Corp.
- DEC MicroVAX 2000
- DEC MicroVAX 3500
- DEC MicroVAX 3600
- DEC MicroVAX II
- DEC VAX 6200
- DEC VAX 6210
- DEC VAX 6220
- DEC VAX 6230
- DEC VAX 6240
- DEC VAX 8250
- DEC VAX 8350
- DEC VAX 8530
- DEC VAX 8550
- DEC VAX 8700
- DEC VAX 8800 Series
- DEC VAX 8820
- DEC VAX 8830
- DEC VAX 8840
- DEC VAX 8842
- DEC VAX 8974
- DEC VAX 8978
- DEC VAX 11/700 Series
- DEC VAX 11/725
- DEC VAX 11/730
- DEC VAX 11/750
- DEC VAX 11/780
- DEC VAX 11/785

Gould
- MFX

Harris
- H Series
  - H100
  - H200
  - H700
  - H800
  - H900
  - H1000
  - H1200
  - H1500
  - H1600
- Harris HCX5
- Harris HCX5
- Harris HCX7
- Harris HCX9

Hewlett-Packard
- HP 3000 Family
  - Micro 3000 LX
  - Micro 3000 GX
  - Micro 3000 XE
  - Series 70
  - Series 925
  - Series 925 LX
  - Series 935
  - Series 950
  - Series 955
- HP 9000 Family
  - Model 319
  - Model 320
  - Model 330
  - Model 350
- Model 360
- Model 825
- Model 835
- Model 840
- Model 850
- Model 855

Honeywell Bull
- DPS 6 +
  - 200 Series
    - Model 200
  - 210 Series
    - Model 211
  - 220 Series
    - Model 221
  - 400 Series
    - Model 402
    - Model 403
    - Model 404
  - 410 Series
    - Model 412
    - Model 413
    - Model 414
  - 420 Series
    - Model 422
    - Model 423
    - Model 424
  - XPS 100 Series
    - X15
    - X22
    - X42

IBM
- Application System/400
- Series 1
- System/36
- System/38
- System/88
- 4575 Processor Model 20B
- 4576 Processor Model 40
- 4576 Processor Model 50
- 4576 Processor Model 60
- 4576 Processor Model 81
- 4576 Processor Model 82
- 4576 Processor Model 83
- 4576 Processor Model 84
- 4576 Processor Model 85
- 4576 Processor Model 86

ICL
- DRS 300
- CLAN

Intergraph
- 200
- 250
- 252
- 350

Micro II

NCR
- Tower Family
  - NCR mini/Tower
  - NCR Tower Series
    - 32/200
    - 32/400
    - 32/450
    - 32/600
    - 32/650
    - 32/800
    - 32/850

Nixdorf
- Targon Family

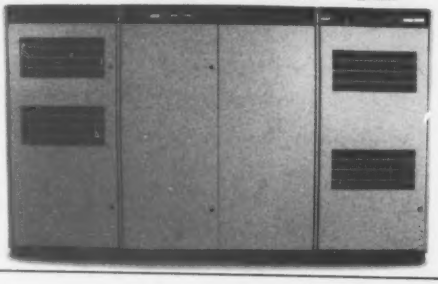
Olivetti
- LSX 3000 Series

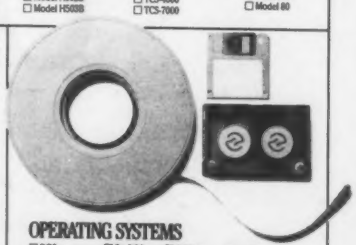
Prime
- 386 EXL Series
  - EXL 316
  - EXL 320
  - EXL 325
- 50 Series
  - Tower Systems
    - Model 2350
    - Model 2450
    - Model 2455
  - 6000 System
    - Model 4050
    - Model 4150
    - Model 4450
  - 6000 System
    - Model 6150
    - Model 6250
    - Model 6350

Tandem
- NON-STOP II
- TXP
- CLX

Unisys
- 5000 Series
  - 5000/35
  - 5000/55
  - 5000/85
  - 5000/95
- 6000 Series
  - 6000/50
- 7000 Series
  - 7000/30
- 7000/40
- 7000/50
- 7000/51
- 7000/52

Wang
- VS 5000
- VS 5400
- VS 5430
- VS 5440
- VS 5450
- VS 5460
- VS 5E
- VS 6E
- VS 75E
- VS 7100
- VS 7110
- VS 7120
- VS 7150
- VS 7310
- VS 7320
- VS 5
- VS 6
- VS 15
- VS 25
- VS 45
- VS 65
- VS 85
- VS 90
- VS 100



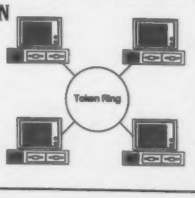


OPERATING SYSTEMS

- DOS
  - MS-DOS
  - PC-DOS
  - NCR-DOS
- ProDOS
- TRSDOS
- VersaDOS
- GCOS 6
- GCOS 7
- GCOS 8
- Macintosh
- MVS
- OS/2
- PRIMOS
- UX/TRIX
- UNIX
- VM
- VMS
- XENIX

TRANSMISSION MEDIA

- Broadband
- Fiber Optic
- LocalTalk
- Microwave
- Public Data Network
- Satellite
- TI
- Thick Ethernet
- Thin Ethernet
- Token Ring
- Twisted Pair



AS YOU'D LIKE.

PERIPHERALS

Boards
- ☐ AboveBoard
- ☐ High Page
- ☐ IBM Token Ring Adapter Card

- ☐ Laserwriter
- ☐ Laserwriter II NT
- ☐ Laserwriter NT
- ☐ Laserwriter Plus

AST
- ☐ Turbolaser P/S

- ☐ ProWriter C715
- ☐ ProWriter Jr. +
- ☐ StarWriter D10
- ☐ Jetwriter Laser

Citizen
- ☐ 120-D

- ☐ MSP-55
- ☐ Premiere 35
- ☐ Tribute 124
- ☐ Tribute 224

Diablo
- ☐ 630 API
- ☐ Advantage D25

Epson
- ☐ DFX5000
- ☐ EX800
- ☐ FX1050
- ☐ FX286E
- ☐ FX850
- ☐ LX800
- ☐ LQ Series
  - ☐ LQ1050
  - ☐ LQ2500
  - ☐ LQ2550
  - ☐ LQ500
  - ☐ LQ850
  - ☐ LQ950
- ☐ LX800
- ☐ MX Series
- ☐ RX Series

Fujitsu
- ☐ RX7100
- ☐ RX7200

- ☐ RX7300

Hewlett-Packard
- ☐ LaserJet
- ☐ LaserJet Model 2
- ☐ LaserJet 2000
- ☐ LaserJet 500 +
- ☐ LaserJet +
- ☐ LaserJet Series II
- ☐ ScanJet
- ☐ Deskjet
- ☐ HP 7475A Plotter
- ☐ HP 7550A Plotter

IBM
- ☐ ProPrinter

NEC
- ☐ LC860
- ☐ LC890
- ☐ P6 Pinwriter
- ☐ P7 Pinwriter
- ☐ P5XL Pinwriter
- ☐ P2200 Pinwriter

Okidata
- ☐ Laserline 6
- ☐ Microline 192 Plus
- ☐ Microline 193 Plus
- ☐ Microline 292
- ☐ Microline 293

- ☐ Microline 393

Panasonic
- ☐ KX-P1080i
- ☐ KX-P1091i
- ☐ KX-P1092i

Star Micronics
- ☐ ND15
- ☐ NR10
- ☐ NR15
- ☐ NX1001
- ☐ NX15

Toshiba
- ☐ PageLaser
- ☐ 321 SL
- ☐ 341 SL
- ☐ 351 SX
- ☐ 351 C-2

Xerox
- ☐ Model 3044
- ☐ Model 4045
- ☐ Model 4075
- ☐ Model 4090
- ☐ Model 8700
- ☐ Model 8790
- ☐ Model 9700
- ☐ Model 9790

Telecommunications

Amdahl
- ☐ 4730X Communications Processor
  - ☐ 4725
  - ☐ 4725E
  - ☐ 4745

Digi-Link
- ☐ Model DLSSTY-01BC

Hayes
- ☐ Smartmodem 2400
- ☐ Smartmodem 1200
- ☐ V Series 9600
- ☐ Personal Modem

IBM
- ☐ 3720 Communication Controller
- ☐ 3721 Expansion Unit

- ☐ 3725 Communication Controller Model 1
- ☐ 3725 Communication Controller Model 2
- ☐ 3728 Communication Control Matrix Switch
- ☐ 7170 Device Attachment Control Unit (DACU)
- ☐ 7171 ASCII Device Attachment Control Unit

- ☐ 7426 Terminal Interface Unit
- ☐ 7427 Console Switching Unit
- ☐ 9736 Integrated Digital Network Exchange Model 20
- ☐ 9737 Integrated Digital Network Exchange Model 40
- ☐ 9738 Integrated Digital Network Exchange Model 70
- ☐ IBM 9751 CBX

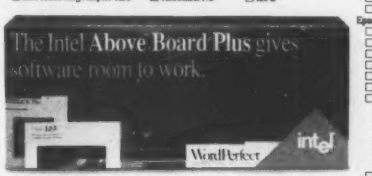
Natural Microsystems
- ☐ Watson Voice System

Racal-Vadic
- ☐ 1200VP
- ☐ 1200PA
- ☐ 2400VP
- ☐ 2400PA Model 2
- ☐ 9600VD

Series
- ☐ Integrator 1544

Trilink Corp.
- ☐ Trailblazer Plus

Ven-Tel
- ☐ II-K



- ☐ InBoard 386
- ☐ J-Laser Board
- ☐ TinyTurbo 286

Printers, Lasers, Scanners

Apple
- ☐ Laserwriter
- ☐ Laserwriter II NT
- ☐ Laserwriter NT
- ☐ Laserwriter Plus

AST
- ☐ Turbolaser P/S

C. Itoh
- ☐ PW 1550S + NLQ
- ☐ PW 8510S + NLQ
- ☐ ProWriter 310
- ☐ ProWriter 315

- ☐ 180-D
- ☐ MSP-15E
- ☐ MSP-40
- ☐ MSP-45
- ☐ MSP-50

APPLICATION SOFTWARE

- ☐ 1-2-3
- ☐ 1-2-3 Networker
- ☐ 4th Dimension
- ☐ Ability
- ☐ Access/X.25/SDLC/QLLC
- ☐ AccountMate
- ☐ AccountMate III Plus
- ☐ ACCPAC BPI Accounting
- ☐ ACCPAC Plus
- ☐ Adobe Illustrator
- ☐ Advanced Revelation
- ☐ Aerus
- ☐ AIMS
- ☐ AppleLink
- ☐ Application Development System
- ☐ ARKIVE
- ☐ Asynchronous Communications Server
- ☐ AutoCAD
- ☐ BABY/36
- ☐ BBx Progression/2
- ☐ Btrieve
- ☐ Btrieve/N
- ☐ C Language RPC Compiler
- ☐ C-ISAM
- ☐ Carbon Copy
- ☐ Case Management System
- ☐ CC-Assist
- ☐ CertiFlex
- ☐ Champion III
- ☐ ChiLan CS-1 UTS Gateway
- ☐ CLC
- ☐ Clipper
- ☐ Close-Up
- ☐ Color Magic
- ☐ Condor 3
- ☐ Context
- ☐ Cricket Draw
- ☐ Cricket Graph
- ☐ CROSSPOINT
- ☐ Crosstalk XVI
- ☐ Crosstalk XVI for Networks
- ☐ CYMA
- ☐ DataEdge
- ☐ DataFlex
- ☐ DataLex
- ☐ dBASE Graphics
- ☐ dBASE III Plus
- ☐ dBXL
- ☐ Direct Net
- ☐ DisplayWrite 4
- ☐ Distribution Manager
- ☐ DT Network
- ☐ EasyFiler
- ☐ EasyGate
- ☐ EasyWriter II
- ☐ EGA Paint
- ☐ Enable/LAN
- ☐ Enrich
- ☐ EtherComm
- ☐ EtherConnect—LAN Interface for PC S/W
- ☐ Eureka: The Solver for the Macintosh
- ☐ Eureka: The Solver IBM Version
- ☐ Excalibur Plus
- ☐ Extended Features
- ☐ FailSafe
- ☐ File & Find
- ☐ Filemaker Plus
- ☐ Focal Point
- ☐ ForComment: Network Version
- ☐ FoxBASE +
- ☐ Framework II
- ☐ FreeHand
- ☐ Freelance
- ☐ Freelance Plus
- ☐ GEM Desktop
- ☐ GEM Draw
- ☐ GEM Graph
- ☐ GP
- ☐ Great Plains
- ☐ Harmony
- ☐ Harvard Graphics
- ☐ Harvard Total Project Manager
- ☐ Higgins Group Productivity Software
- ☐ High Stepper
- ☐ HyperCard
- ☐ ICMS
- ☐ Informix-4GL
- ☐ Informix-ISAM
- ☐ Informix-SQL
- ☐ InfoTrax
- ☐ Insurance Writer
- ☐ IRMALAN
- ☐ Javelin
- ☐ JetTax
- ☐ KeyEntry III/LAN
- ☐ LAN Administrator's Kit
- ☐ LAN Shell
- ☐ LAN:Datacafe
- ☐ LAN:DataStore
- ☐ Lanscope
- ☐ Legal Billing II +
- ☐ LinkUp 3270 Gateways
- ☐ MacDraw
- ☐ Macola
- ☐ MacProject
- ☐ MacWrite
- ☐ Magic PC
- ☐ Manufacturing Manager
- ☐ MasterDesigner II
- ☐ MathPlan
- ☐ Maxess SNA Gateway
- ☐ Maynstream
- ☐ McMax
- ☐ MDBS III
- ☐ Me2
- ☐ Metro
- ☐ MICA
- ☐ Microsoft Assembler
- ☐ Microsoft C Compiler
- ☐ Microsoft Chart—Macintosh Version
- ☐ Microsoft Chart—PC Version
- ☐ Microsoft Excel
- ☐ Microsoft Excel for the PC
- ☐ Microsoft File
- ☐ Microsoft Linker
- ☐ Microsoft Project
- ☐ Microsoft QuickBasic
- ☐ Microsoft Word for Macintosh
- ☐ Microsoft Word for the PC
- ☐ Morel
- ☐ MultiMate Advantage II LAN
- ☐ Multiplan
- ☐ NETmanager—The LAN Support Center
- ☐ NETremote—Network Productivity Tool
- ☐ NetTime
- ☐ Netway 100A/AE
- ☐ Network Co-Processor
- ☐ NIN
- ☐ NINplus
- ☐ Nursing Information Network
- ☐ O'Hanlon's Data Base Solutions
- ☐ OAT:OATGATE
- ☐ Office Writer
- ☐ OMNIS 3 Plus
- ☐ Open Access II Network
- ☐ Operating Room Information Network
- ☐ Orchestrade Series
- ☐ ORIN
- ☐ OSAS
- ☐ PageMaker for the Macintosh
- ☐ PageMaker for the PC
- ☐ Paradox
- ☐ PC Focus
- ☐ PC Paint Plus
- ☐ PC Watch
- ☐ PC-Anywhere
- ☐ PC/TCP Network Software
- ☐ PCOX/Gateway—16
- ☐ Personal Editor 2 (PE2)
- ☐ Personnel Resource Network/Schedule
- ☐ PFS:Professional File
- ☐ PFS:Professional Network
- ☐ PFS:Professional Plan
- ☐ PFS:Professional Write
- ☐ PlanPerfect
- ☐ Platinum
- ☐ PLUS78—VIP Terminal Emulation
- ☐ Point of Sale for Real World
- ☐ Poly-STAR/220 & 240 for DEC LAT networks
- ☐ Poly-STAR/220 & Poly-STAR/240
- ☐ Power Manager
- ☐ PowerBase
- ☐ PowerPoint
- ☐ PROGRESS
- ☐ Project Manager
- ☐ Property Management
- ☐ PWS/IDEAS
- ☐ Q-Pro 4
- ☐ Quattro
- ☐ QuickConnect
- ☐ QuickSilver
- ☐ R&R Relational Report Writing
- ☐ R:BASE CLOUT
- ☐ R:BASE Extended Report Writer
- ☐ R:BASE for DOS
- ☐ R:BASE Program Interface (PI)
- ☐ R:BASE Runtime
- ☐ R:BASE System V
- ☐ RDM
- ☐ Ready, Set, Go!
- ☐ Real World
- ☐ Reference Point
- ☐ Reflex—the Analyst
- ☐ Reflex Plus
- ☐ Retail Inventory Control
- ☐ Reveille
- ☐ RM/COBOL
- ☐ RM/COBOL-85
- ☐ RM/Net + 5
- ☐ Sales Executive
- ☐ Samna Word Plus IV
- ☐ SBT Database Accounting Library
- ☐ Shoebox 3
- ☐ SideKick for the IBM PC
- ☐ SideKick for the Macintosh
- ☐ SmartCom II
- ☐ SNADS Gateway/3 + Mail
- ☐ Softerm PC
- ☐ SQLBase
- ☐ SuperCalc
- ☐ SuperCalc LanPak
- ☐ SuperKey
- ☐ SuperPaint
- ☐ SuperProject Expert
- ☐ SuperProject Expert LanPak
- ☐ SURPASS
- ☐ Surveyor's Management System
- ☐ Symphony
- ☐ T3
- ☐ TCS Total Accounting System
- ☐ TEAM-UP
- ☐ TEL
- ☐ The Coordinator System
- ☐ The Skeduler
- ☐ The Smart Software System
- ☐ The Spreadsheet Auditor
- ☐ Timberline
- ☐ Volkswriter Scientific
- ☐ Windows
- ☐ Windows/386
- ☐ WordPerfect
- ☐ WordPerfect—Library
- ☐ Words & Figures
- ☐ WordStar 2000
- ☐ WordStar 2000 Plus
- ☐ WordStar Professional
- ☐ Xtrieve
- ☐ Xtrieve Report Writer Option
- ☐ XyWrite III
- ☐ XyWrite III Plus
- ☐ Zilli
- ☐ ZyINDEX

PROTOCOLS

- ☐ AFP
- ☐ Async
- ☐ Biasync
- ☐ DLC
- ☐ HDLC
- ☐ OSI
- ☐ SDLC
- ☐ SMB
- ☐ SNA
- ☐ TCP/IP
- ☐ X.25
- ☐ XNS

- ☐ Time Line
- ☐ Time Line Graphics
- ☐ Total Word
- ☐ Turbo C
- ☐ Turbo Database Toolbox
- ☐ Turbo Editor Toolbox
- ☐ Turbo Graphix Toolbox
- ☐ Turbo Pascal
- ☐ Turbo Pascal Database Toolbox
- ☐ Turbo Pascal for the Macintosh
- ☐ Turbo Prolog
- ☐ Turbo Tutor
- ☐ Unify
- ☐ VAL/PITSC
- ☐ Vanguard PCB Design System
- ☐ Ventura Publisher
- ☐ Vfeature Deluxe
- ☐ ViewStar Pro Series
- ☐ Volkswriter Deluxe Plus
- ☐ Volkswriter III LAN

Take a moment to look over this page.

Anything you check, we can combine into a single, integrated network.

With the flexibility to change as your needs change.

That's because at 3Com we can network more types of systems to more types of systems.

We make over 350 modular networking products. Everything from adapter boards to network operating systems to mainframe connections.

Each one built upon a platform of established industry standards. Making incompatibility virtually a non-issue at any level. Be it corporate, departmental or workgroup.

Now, take a moment to look over your preferred vendor list.

If 3Com isn't on it, maybe you should call 1-800-NET-3Com, Dept. AF.

And check us out.

3Com®

We network more types of systems to more types of systems.

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Alternative?

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then adopt it as a standard for cooperative processing.

Ford Motor Co. offers a good example of engineering as an entry point for TCP/IP into the commercial sector. Ford currently has about 2,000 computers using TCP/IP protocols, including IBM Personal Computers, DEC minicomputers and Sun Microsystems, Inc. and Apollo Computer, Inc. engineering workstations. Most of the TCP/IP machines are at the Ford Research and Engineering (R&E) Center, a complex of 21 buildings in Dearborn, Mich. Other machines are located at Ford Aerospace Corp. facilities across the country.

Interoperability is critical for Ford both because of the variety of its computer equipment and because different locations must often cooperate on projects or use the results of one project in a different project. In addition, data produced at one site may be analyzed at another, necessitating file transfer.

The following are just a few examples of the way TCP/IP smooths the way for working communications in the auto maker's engineering and research operations.

- A DEC PDP-11 is used to collect data from experiments on car engines. It sends the data to a central facility for analysis. The only protocol supported under the version of the operating system used is TCP/IP. If the company were to upgrade the operating system, the data collection application would no longer run. Thus, the application is file transfer, and TCP/IP is the only realistic choice.
- A PC collects data on engine exhaust and ships it to a Vaxcluster for analysis. TCP/IP was chosen as the means to accomplish that transfer because other engineering machines are also using it.
- When an engineer needs to send document or spreadsheet files to another engineer, he uses the TCP/IP File Transfer Protocol (FTP) to do so. If the engineer does not have an identification on the recipient's machine, he can convert the file to ASCII and send it via the Simple Mail Transfer Protocol (SMTP).

More to come

Two thousand machines may seem like a large network, but there is more to come. Within four or five years, about 10,000 workstations will be in place at the R&E center, with another 5,000 at other locations in the U.S., Europe, Australia and the Near East, according to Fred Ball, network manager at Ford's Scientific Research Laboratories (SRL), which are a part of the R&E center. At least several thousand of those workstations — perhaps as many as half of them — will use TCP/IP.

The research laboratories do have a small OSI-based network with half a dozen or so workstations, which is used strictly for development and does not communicate with any other equipment.

The fact that this system ran OSI was not the motivation for purchase, however, Ball says. "We just needed the system, and the system ran OSI."

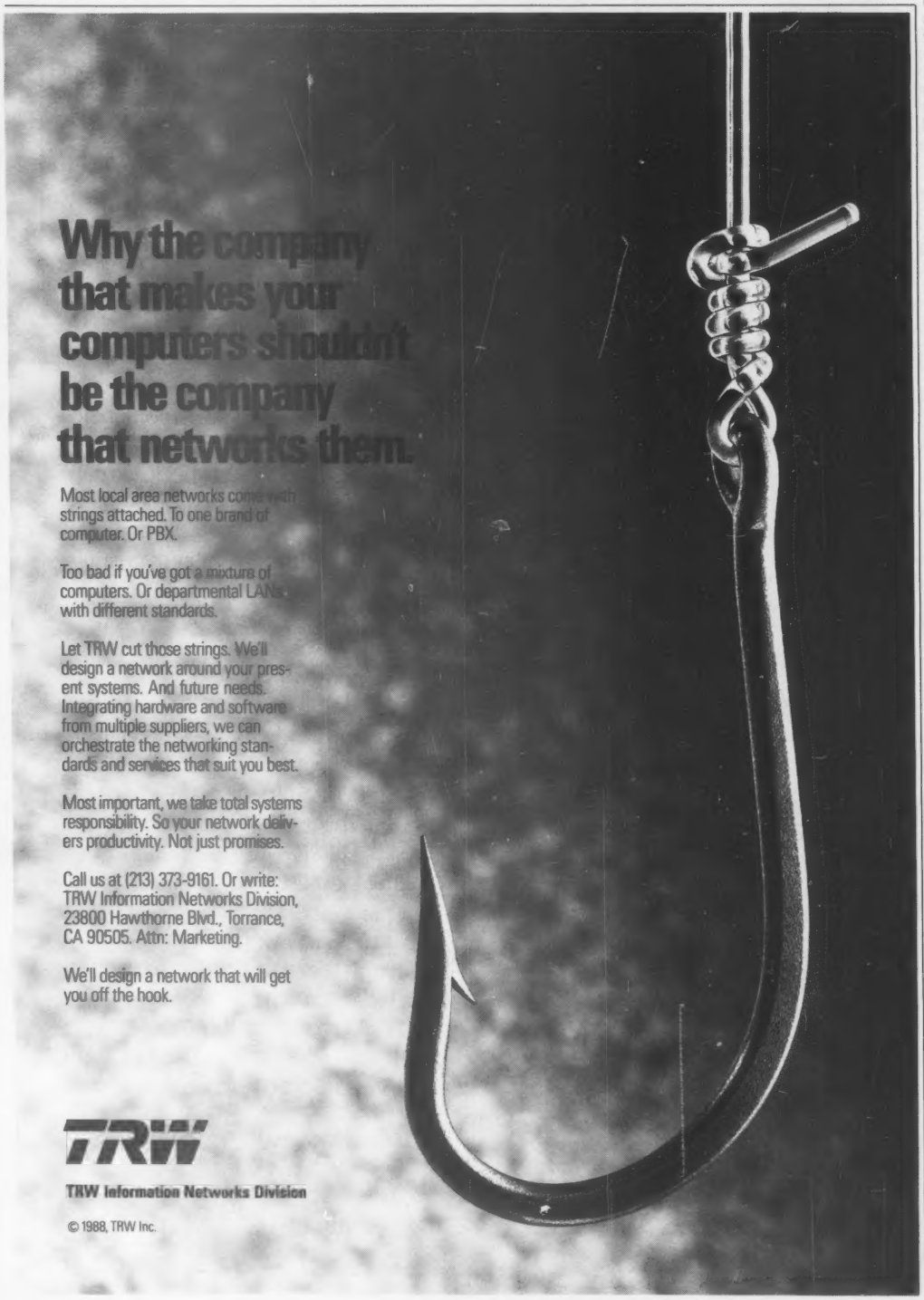
The R&E center also has large Decnet, Primenet (X.25) and Sytek, Inc. networks. However, OSI protocols are not expected to bear any significant part of the SRL's network load in the next three or four years, and Ball says he expects the same to be true for the rest of the organization.

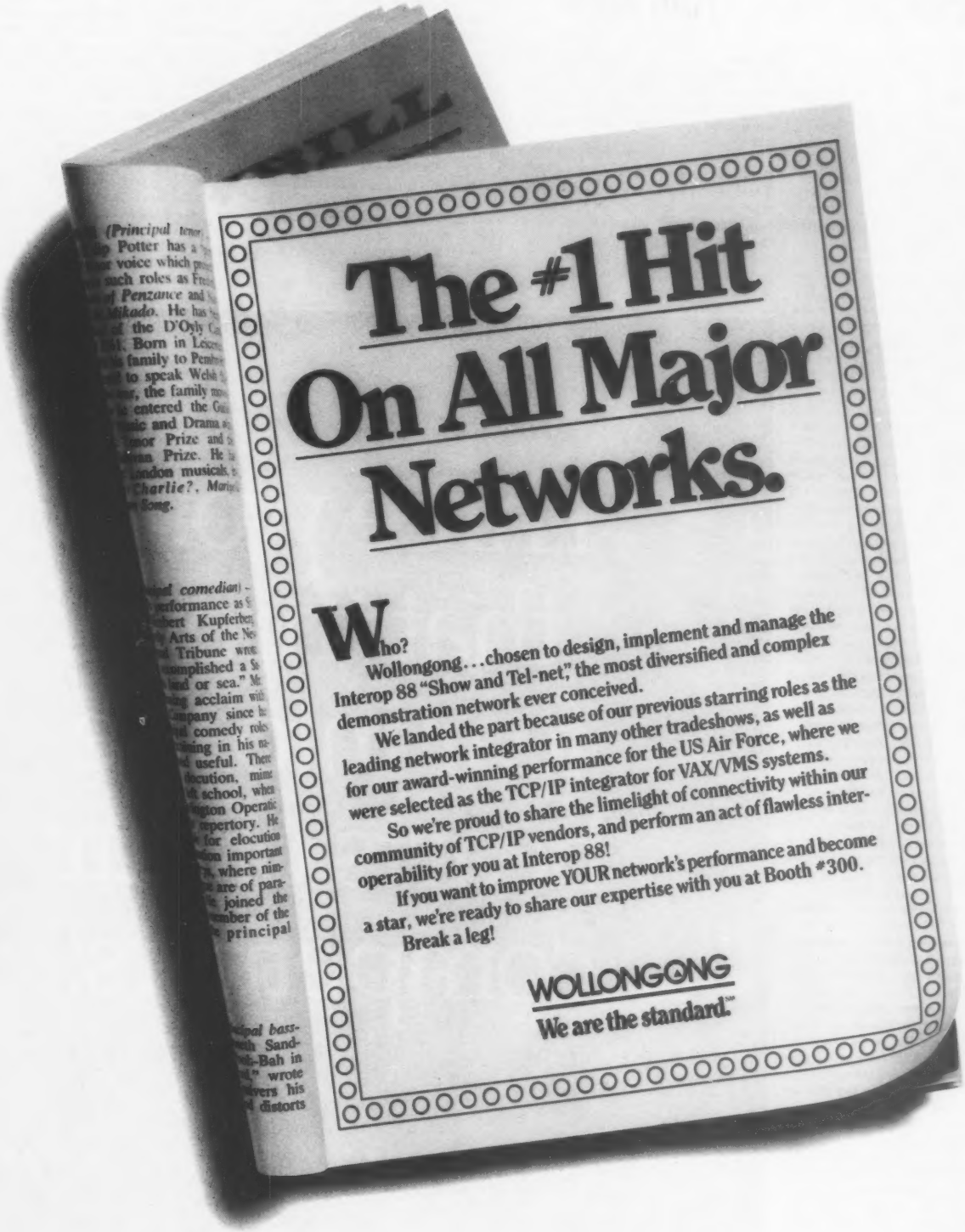
Although Ball says he expects the SRL's network to migrate to some set of OSI protocols eventually, he says there is no schedule for that migration.

"Right now, engineering is buying workstations that use the Unix platform," he explains. "All of the workstation vendors support the basic TCP/IP applications. Not enough vendors support enough of OSI [for migration] to make sense." And by the time those vendors do get around to offering full OSI support, he adds, Ford will be heavily invested in TCP/IP.

Ford has other networks that are even larger than the engineering network, such as an SNA network with IBM mainframes running IBM's Professional Office System for office

Continued on page 84

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BY EINAR STEFFERUD

The exact time isn't clear, but at some point in the near future, the torch of network interoperability will pass from the Transmission Control Protocol/Internet Protocol (TCP/IP) suite to the Open Systems Interconnect (OSI) protocols.

Many people resist the idea that a transition is inevitable, pointing out that TCP/IP is not only here but is supported by a set of proven tools, while OSI remains largely unproven. "Why bother?" they ask. "What is to be gained?" The answers lie in the different levels of application functionality offered by the two protocol suites and in the degrees of adoption and support they can muster.

TCP/IP application development has slowed to a near stop. The popular applications — Telnet, File Transfer Protocol (FTP) and Simple Mail Transfer Protocol (SMTP) — have not advanced in many years. OSI applications, on the other hand, are enjoying intense development and promise to provide new and important functions and services. OSI FTAM provides a virtual file storage capability. OSI X.400 Message Handling Systems (MHS) offer multimedia body parts — such as voice, graphics, facsimile and texts of various kinds — as compared with SMTP's limitation to ASCII text messages. X.400 also offers to carry the mail for electronic document interchange (EDI), making EDI a major innovator for commercial internetworking.

Another advantage of the OSI suite is that it offers distributed application support facilities that allow developers to reuse the same facilities in all applications. These include Abstract Syntax Notation One, or ASN.1, which provides a powerful "external data format" for abstract definition of data structures and their encoding for unambiguous exchange among distributed application modules. This external formatting specification permits the exchange of information in a standard and straightforward way, while allowing systems to store data differently.

A number of other advantages are attached to the OSI suite, but the overriding one is strong international agreement with support from all significant vendors.

So, the answer is yes: The transition is necessary and will be worth the effort if we can just find a way to do it right. The objective is to have our cake and eat it too. We want to exploit the here-and-now advantages of the TCP/IP suite and also position ourselves to exploit the advantages of the new OSI suite when and as it becomes available.

Based on work done by Marshall Rose, principal software engineer with the Wollongong Group, several routes for moving from TCP/IP to OSI have been developed. Various combinations of protocol stacks, application gateways and service bridges and tunnels can be used for the transition. The choices are between rough and smooth, abrupt and gradual, complex and simple, efficient and inefficient.

An ideal strategy would provide coexistence over a long enough period of time for users to convert, keeping in mind work schedules and timetables for normal system upgrades. This suggests running both protocol suites across networks to allow users to pick their own timing for conversion.

Dual stacks with gateways

The dual-stack-with-gateways approach, when possible, is simple — just install both suites on all hosts and let users choose which they prefer. Unfortunately, this may not be possible on every host.

Inevitably, in any network, there will be one or more hosts that cannot accommodate both protocol stacks.

This situation might be acceptable if all single-stack hosts have the same single stack so all hosts can interwork. When there are single-stack hosts of different persuasions, then application gateways can help. Application gateways, where needed between protocols, can be used to transform exchanged data objects.

Gateways are widely known, but their operation is not well understood. They work by mapping the service elements or data elements from one side to the other. Gateways work best for store-and-forward applications such as electronic mail where an information object can be transformed as a whole unit while it is in a static state between transfers.

With an FTP-to-FTAM gateway, a transferred file must be handled on the fly in the gateway, or the gateway must stage the transfer by temporarily placing the file in a gateway buffer. The latter involves two separate transfers, one with FTP and one with FTAM. Virtual terminal interactive protocols must be put on a gateway on the fly in any case.

Problems arise when no mapping or, worse, only partial mappings exist for some services or data elements. In this case, the gateway can only translate a subset that is common to both, typically with some loss of functionality in both directions. Sometimes, an object transformed in one direction cannot be transformed back to its original form because of mapping difficulties.

Let's assume our goal is to make the

Three words that throw fear into the hearts of our competitors:

Stefferud is president of Network Management Associates, Inc., a Huntington Beach, Calif., consulting firm specializing in strategic planning for Internet environments.

transition from TCP/IP to OSI over an extended period of time. This implies a need to support interworking between two communities, one running TCP/IP and one running OSI protocols.

Dual stacks do little to facilitate such interworking. Instead, they create two separate networks, both of which need to be administered, requiring at least twice the effort. Without gateways, little interworking will occur between them.

Thus, the dual-stack approach requires gateways and imposes some limits on the functionality available to users.

Service emulation

Another transition approach is service emulation. For example, with transport service emulation, users could use the reliable circuit services of TCP under a thin protocol layer to provide the services of the OSI transport layer. Then, regular OSI session, presentation and application protocols can be employed to offer pure OSI services to applications running in TCP/IP networks.

WE WANT TO exploit the here-and-now advantages of the TCP/IP suite and also position ourselves to exploit the advantages of the new OSI suite when it becomes available.

With OSI transport services running over TCP, users can immediately begin to implement OSI applications and deploy them for use in TCP/IP nets as soon as they are ready. Then, when full OSI stacks are ready, users can simply move them over and keep on running. This OSI transport emulation arrangement is defined in an Internet Request For Comments, or RFC1006. Running in Internet for years on an experimental basis, it uses early implementations of OSI protocols.

There is still another issue to consider with service emulation, given the goal of coexistence and smooth interworking between the TCP/IP and OSI communities. The issue to be resolved is that of interworking between the OSI applications running in TCP/IP nets and OSI applications running in OSI nets.

The solution is simple, if not totally elegant. Both communities support the OSI transport service. To join applications running in both communities, a transport level bridge, called a transport service bridge, or TS-bridge, is needed.

Because it is designed to bridge two dissimilar transport protocols, a TS-bridge does not provide an end-to-end check sum but uses two end-to-end check sums (one from the application running in the TCP network to the bridge, the other from the bridge to the application running in the OSI network).

For the most part, the lack of a true end-to-end check sum is unimportant because the simplicity of a TS-bridge allows us to use manual error checking to debug it. Its only failure should be because of hard memory faults in its host computer.

A better solution than a TS-bridge is to move down to the OSI Connectionless-Mode Network Service layer and ship Connectionless Mode Network Protocol (CLNP) protocol data units (PDU) inside IP packets. These packets are sent with simple encapsulation rules and address mappings to carry the PDUs to the other end of the "tunnel," where they are decapsulated and treated exactly as though they had been delivered by a regular CLNP network. Thus, users can mount OSI transport services over CLNP, passing the CLNP packets through an IP tunnel in an IP network.

The NS-Tunnel affords full end-to-end transport services with end-to-end check sums. It is entirely transparent to OSI end users and allows full interworking between OSI applications in OSI and TCP/IP networks. It uses existing IP routing services.

Service emulation at either the transport or the network level affords better and more transparent strategies than we can get with gateways and dual stacks, with less complexity. The NS-Tunnel makes the two nets look and feel more homogeneous, but both bridges and tunnels offer complete interworking functionality for OSI applications in mixed-stack networks, without the costs of complete dual stacking or the need to reimplement any of the applications from one protocol suite in the other.

Coexistence, interworking

If we can achieve adequate coexistence between TCP/IP and OSI protocols, with smooth interworking of OSI applications running in both TCP/IP and OSI networks, then user transition can take care of itself with natural evolution, as users find and claim the greater functionality of the new OSI applications.

Ranking of the alternatives is as follows: Dual stacking with gateways works but reduces functionality; TS-Bridging is next best and can be used to achieve full functionality with some addressing complexities and some minor loss of end-to-end service quality; and NS-Tunnels are the closest thing to full transition.

Probably the best course is to use all of the last three methods. You will most likely find that gateways are a natural first step, to be followed in turn by TS-Bridges and NS-Tunnels as the new OSI products become available. •

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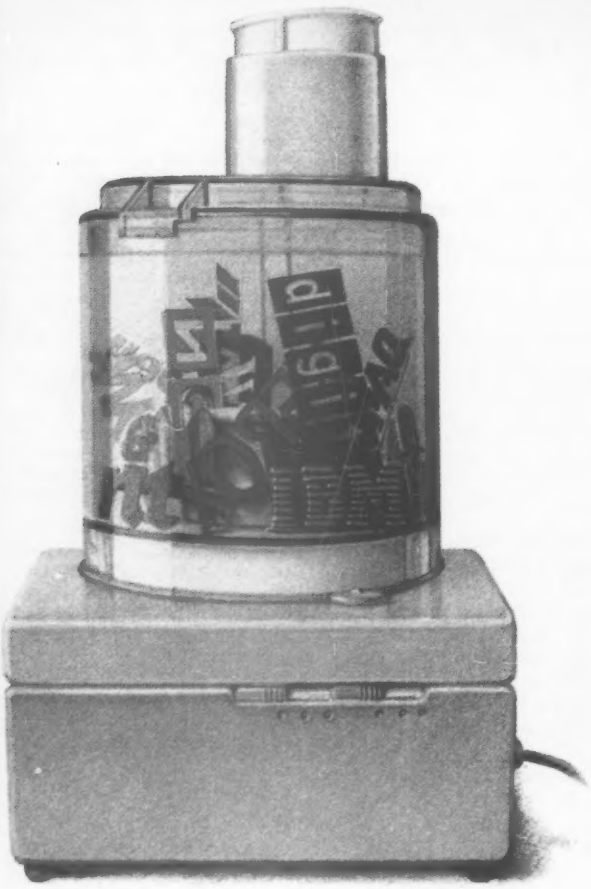

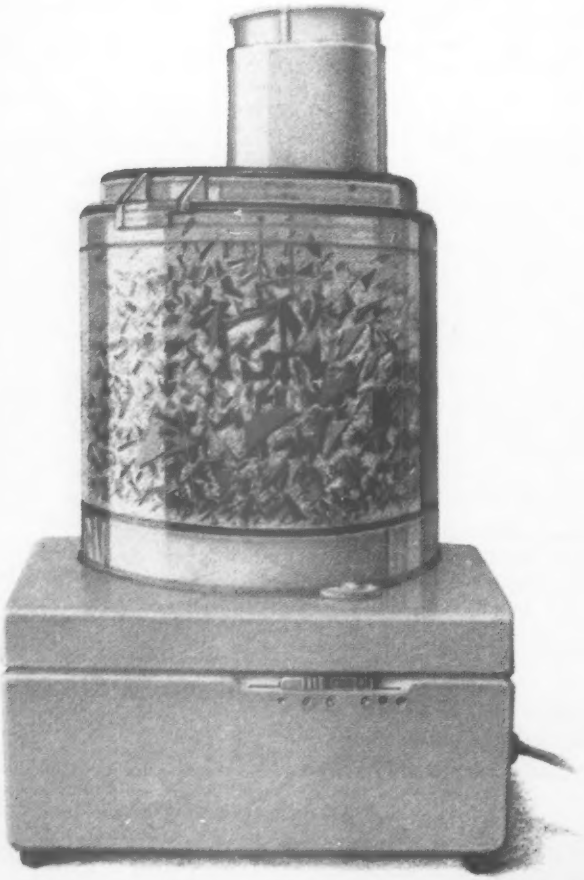

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Alternative?

CONTINUED FROM PAGE 78

automation. Connecting those networks to the SRL is now being considered.

Another major auto maker, Chrysler Corp., is also a committed user of TCP/IP. As Dan Lynch, president of Advanced Computing Environments Co., observes, it is the Fortune 100 that are leading the charge into TCP/IP, and "the oils, the autos and the banks" are the heaviest investors in this heavyweight group.

Chrysler is currently constructing a TCP/IP computer-aided design and manufacturing (CAD/CAM) network. According to technology planner Bob Rogers, the network now connects about 50 Silicon Graphics, Inc. and Apollo workstations. He expects the number of connected workstations will reach approximately 300 by the end of the year and may eventually top 1,000.

The plan, Rogers says, is to build an environment that will accommodate any platform. The best medium for doing that, he says, is TCP/IP. "TCP/IP is the right choice in a heterogeneous network, if you want to have an open environment," he explains.

In the past, Chrysler relied exclusively on mainframe-based interactive systems. Those systems, which include an engineering data library, will continue to be used with connections to the TCP/IP network provided by numerous gateways. The TCP/IP protocols will dominate only in the engineering network.

That is also the case at Hewlett-Packard Co. in Cupertino, Calif.

Two years ago, Norman Kincl, a project manager at the company, helped design a TCP/IP network to support HP research and development groups both here and abroad. The network, which was installed as a pilot project in July 1986, had expanded to 1,000 computers by January 1987 and served more than 6,500 as of May.

But just because something works well in one place doesn't necessarily mean that you have to apply the same solution everywhere.

"The corporate and engineering networks may never be fully integrated," Kincl says, explaining that since business users do not generally need access to CAD/CAM systems or engineering minicomputers, there is little need to convert their systems to TCP/IP.

The corporate and engineering networks already share transmission facilities, such as T1 lines and an X.25 network, where that is economically advantageous. And when engineers need to access the business computers to submit financial reports, for example, they are able to do so through LANs.

Here and now

Even if full conversion to TCP/IP isn't in the cards, Kincl says there is little prospect of the protocol set losing any ground to OSI in the near future.

"I wouldn't want to have to build a large network based solely on OSI standards today," he says. "Most of the vendors don't support all the OSI functionality you would need to connect large numbers of engineering and R&D workstations." Such an undertaking could be a possibility in the future, he points out, but the problem is that nobody really seems to know when OSI will really be ready.

"People have been saying 'two years' for the last five years," Kincl says. "Maybe it really is two years now, but I can't say when it will happen."

Chrysler's Rogers is betting on a long time frame. "It may be five to 10 years before OSI is appropriate for a high-performance network like ours," he says.

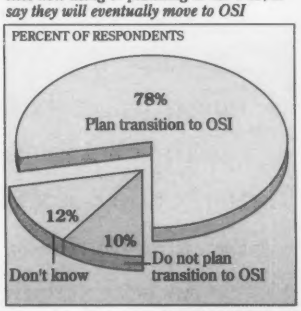
Although 10 years may sound pessimistic, it is a figure that other network managers corroborate. "I think it will be 10 years to see OSI work," says Charles Ganim, a staff manager and engineer at New York Telephone Co. His company, in collaboration with Rochester Telephone Corp., provides TCP/IP networking facilities for 15 academic research institutions in New York state and, more recently, several businesses interested in communicating with those facilities.

Ganim says he believes that people who describe TCP/IP as a short-term solution are misguided. "They're looking at the OSI pipedream," he says. "People will get used to using TCP/IP. There will be switching costs. People may not want to switch. You would really have to justify it."

"Eventually, OSI will become the protocol of choice," explains Joe Seidler, an Infonetics vice-president, but "based on our conversations with users, we think it's going to take a significant amount of time, enough time that TCP/IP equipment will have to be retired because of old age." The big attraction of TCP/IP, he

Transfer passengers

More than three-quarters of 300 surveyed sites now using or planning to use TCP/IP say they will eventually move to OSI



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adds, is that it is here now, and "It works; it's reliable; it gets the job done."

Immediate availability was the deciding factor for Tony Saputo, data center manager at Newmont Mining Co., a Danbury, Conn., Fortune 500 firm specializing in gold mining.

"TCP/IP is a reality. OSI isn't, and I can't afford to wait," Saputo says.

Newmont is just starting to use TCP/IP to link a few newly purchased engineering workstations to the 18 Unisys Corp. A series minicomputers and mainframes that are the backbone of its data processing system. The mainframes and minis are located in sites in New York, Connecticut, Arizona, Nevada, Texas and in Canada.

Saputo explains that Newmont engineers need access to large amounts of information on the mainframes and minis. Low-speed links of 19.2K bit/sec. or less have sufficed to allow the 250 or so IBM PC clones the company owns to get small amounts of financial information from the hosts.

For the large amounts of information needed by engineers, the faster 10M bit/sec. rates of direct Ethernet connections are necessary. In addition, Saputo says, TCP/IP will provide a more flexible and intelligent link, allowing Newmont to implement program-to-program communications between Unix and host applications.

Although his company doesn't have enough experience with TCP/IP to make any firm projections, Saputo says he can envision the network expanding to include 50 to 100 workstations — the whole engineering operation. Once the TCP/IP net is in place, he adds, "I could see it being a long-term marriage, if the features are there and it works as advertised. Change just for the sake of change isn't one of my favorite things."

Reports from the front

Most users report that TCP/IP works, but that doesn't mean they don't have any criticisms of the protocols and the products based on them. They do. They just feel that the inconveniences of working with this protocol set are a lot better than the alternative — working without anything.

Chrysler's Rogers encountered some difficulties in getting the company's IBM mainframes, Control Data Corp. networks and DEC VAXs to converse. One obstacle, he says, was the fact that one of the vendors Chrysler was using was slow in implementing the Address Resolution Protocol (ARP). Certain pieces of equipment expect ARP, he explains, and when they don't see it, the communication or connection isn't made. That problem disappeared, Rogers says, when the vendor began supporting ARP.

Another issue that had to be resolved involved subnetting, which means breaking down internet addresses into smaller parts and giving unique blocks of addresses to smaller networks. Vendors may not support subnetting or may not support it in a consistent fashion.

Chrysler chose to standardize on Class B addressing, which allows you to break the addresses down into 32 addresses per network, as opposed to Class C, which only lets you break them down into blocks of 256. Class B supports many more networks within the same address space. However, not all vendors support Class B, so it was necessary for the company to implement Class C for those vendors and gateway through to the Class B network.

Rogers, however, prefers not to dwell on these negatives.

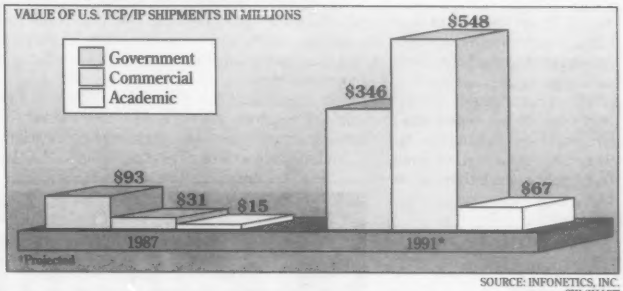
"TCP/IP has all the features that we currently require," he says. "We're committed to it. We're developing in-house expertise in it. It's the only thing that could have done the job here. Some issues have arisen, but we have resolved them."

The various vendors' products play together with minimal problems, if you stick to the basic services: virtual terminal, mail and file transfer," HP's Kincl says, adding that many users need those basic services and, in many instances, TCP/IP is the only way to get them.

"Once you start getting beyond basic services," he explains, "you can start running into problems, things that don't work

Changing course

TCP/IP shipments, which have been directed largely toward government, will shift dramatically toward the commercial sector by 1991



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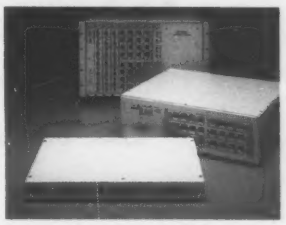

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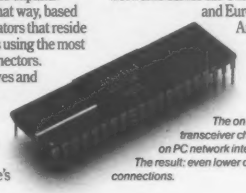

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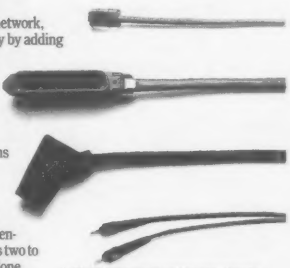

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or aren't supported. We have, for instance, the Network Filing System (NFS) on our [HP 9000 Series 300 and 800] workstations. NFS isn't supported on an Amdahl mainframe or on a DEC system running the Tops 20 operating system."

NFS is not a part of TCP/IP, Kincl notes, but it represents a significant incompatibility between the systems that limits the extent to which they can interoperate.

In addition, he says, some products work better on wide-area networks (WAN) than others. "Some systems are so tuned to the LAN environment that they are just horrible performers or beat the network to death going across a WAN," he suggests.

While saying that TCP/IP is reliable and fulfills his company's needs, Ganim notes that network monitoring and real-time statistics are areas where New York Telephone is not entirely satisfied with its current TCP/IP network. More effective TCP/IP management tools are needed, he says. He says he believes that in many cases the tools are there but vendors have not communicated effectively about them.

Ford's Ball has no such confidence. "There is no TCP/IP network management today," he says. "There is nothing like Netview that comes and tells you what is wrong. You have to go looking for it."

"Incompatibility is not as serious a problem as not having good integrated monitoring and traffic analysis tools," confirms Rich Martin, manager of engineering support for Intel Corp. in Folsom, Calif., which maintains a fast-growing worldwide TCP/IP network for design engineering. "Each vendor has a network management tool, and you can see only a limited amount through one vendor's solution."

Ball says the Internet Activities Board, the major overseeing body for TCP/IP, has recommended that, for now, the Simple Network Management Protocol be adopted as the basis for TCP/IP network management.

But the biggest problem with TCP/IP, according to Ball, is managing subnets. "Not everybody supports subnets. Not all my equipment supports subnets. It's difficult to make all the equipment work together under those conditions.

"In a simple network, you wouldn't require subnets. But I have a complex network with multiple subnets of different sizes, which is actually 'against the rules' in TCP/IP," Ball says.

As a result, Ball has disabled the dynamic routing capabilities for network routes between subnets to prevent the routers from passing inconsistent routing information.

What Ball gains in consistency, however, he loses in reliability. By disabling his routing capabilities, he has lost dynamic reconfiguration of routing patterns between the research facilities and the factory and also between the Ford facilities and the outside world.

Chrysler's Rogers observes that vendors may support TCP/IP only halfway. For instance, he says, "DEC doesn't link TCP/IP to their applications. If you want to use All-In-1, you have to use Decnet drivers." This means support would have to be established for both protocols throughout the network, thus reducing performance and increasing complexity.

And there are a host of other little problems and complaints.

"[TCP/IP is] not quite as easy and rosy as it's painted," Ball says. "It's a little clumsy at times." For instance, he says to send a file using FTP to another

Coexisting Connection Methods

Other network connection technologies being used by surveyed organizations using or planning to use TCP/IP, shown with percentage of organizations mentioning them.

Decnet 42%

Ethernet 27%

Hyperchannel 15%

In-house 12%

SNA gateway 12%

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TCP/IP network, you need a valid user ID and password on a host on that network.

Because of this inconvenience, many users avoid FTP and use the TCP/IP SMTP instead. SMTP mail can be sent to anyone on the network without any special requirements. However, using SMTP means going to great lengths to convert non-text files into text files, Ball notes, since SMTP can only transfer text. It also means that the receiver may have to convert the file back to its original form.

OSI is better

Ford's Ball also notes that OSI does offer technical advantages over TCP/IP. Some of the same people who developed TCP/IP are now developing OSI, he points out. "When you do it a second time, you learn a few things. OSI is richer in function, has more features and deals with problems that are not dealt with in TCP/IP."

For instance, he observes, the OSI mail standard, X.400, provides for attached data "objects" or files of many types and can accommodate formatted word processing files as well as other types of files. "That's very important from my viewpoint," Ball says, adding that Ford might use that capability to attach engineering documents with graphics to X.400 messages.

SMTP, in contrast, can only transfer simple, unformatted text documents. To send a Wordperfect Corp. Wordperfect document — which contains special Wordperfect formatting codes — the user first has to convert it to a simple text document, eliminating the special formatting. It's not nearly as useful as the form with the formatting, Ball notes.

"Some people claim OSI is a more complex, scrambled version of TCP/IP," Kincl explains, adding that this assessment is unfair. He, too, affirms the superiority of X.400 over SMTP. "With X.400, you can send anything and everything: text, graphics, telex, fax, voice, video," he says. The OSI FTAM protocol also offers more functionality than TCP/IP's FTP, Kincl points out.

The main advantage of FTAM is that you can transfer parts of files rather than whole files, Lynch explains. However, he adds, NFS allows partial file transfers, so that FTP plus NFS is approximately equal to FTAM. He says that support for NFS is growing: IBM announced NFS for VM in July, and there will be a version for MVS in the future.

> "TCP/IP is not quite as easy and rosy as it's painted. It's a little clumsy at times."
>
> FRED BALL
> FORD MOTOR CO.

At least one analyst says this superiority will bring OSI to the forefront much more quickly than many are predicting. Mark Leary, director of the Communications Research Program at International Data Corp. in Framingham, Mass., said in a March bulletin that, for TCP/IP, "the end will come quickly and with little fanfare, tears being shed only by those vendors and users caught up in the maelstrom.

"For those vendors and users with the foresight to abandon ship before being pulled in by the irresistible force of quick market gains and short-term solutions," Leary added, "OSI offers a veritable shoreline of solid market growth and connectivity options."

Leary says TCP/IP is safe only for the next year or so. Beyond that, he says, "there will be a fairly rapid divestiture from the TCP/IP protocol suite within both vendor product lines and user networks." Leary sees TCP/IP "rapidly proceeding up the curve and even more rapidly trailing off two years from now."

Leary cites many reasons for this prediction, including the following:

- The availability of solid OSI standards within the next year.
- The increasing coordination among Manufacturing Automation Protocol, Technical and Office Protocol and OSI groups.
- The powerful driving force of

Continued on page 90

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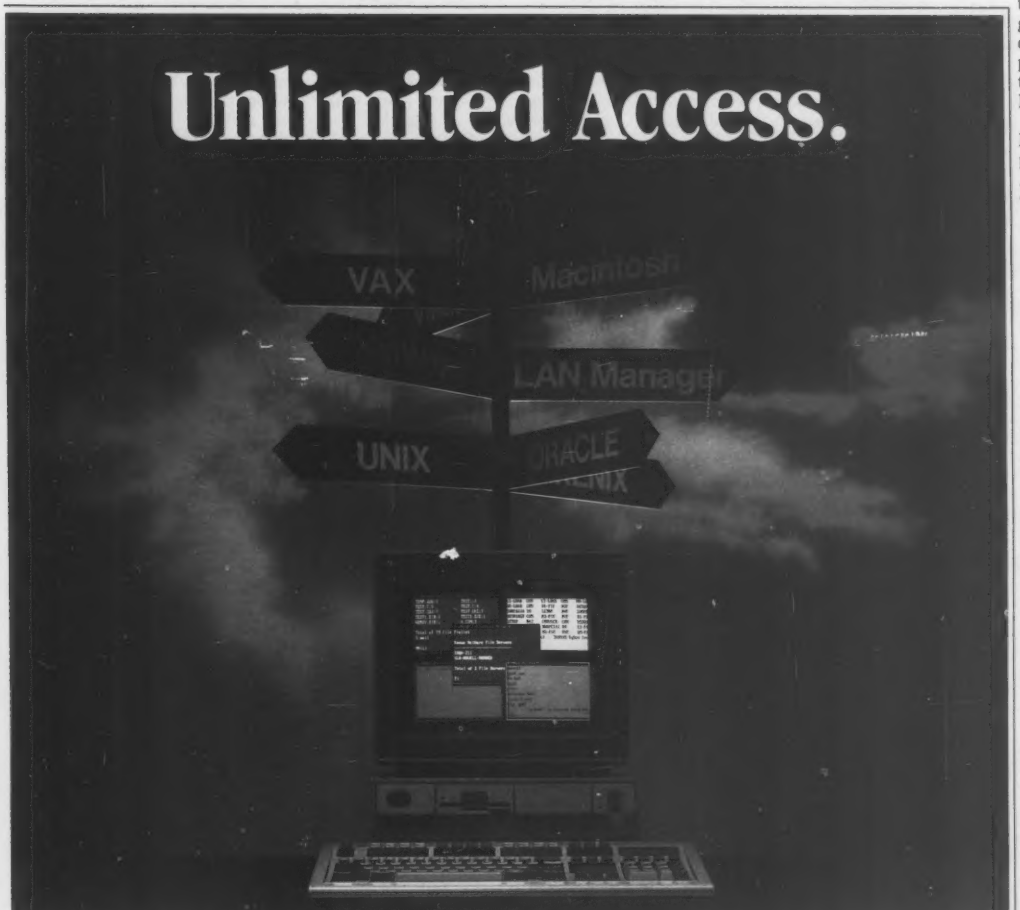

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It runs, but does it purr? Locating TCP inefficiency

BY DOUGLAS COMER

Network managers often ask, "How can I tune TCP/IP for my environment?" A better question might be, "How can I evaluate TCP/IP to understand whether it is performing as well as possible in my environment?"

A manager can do little to tune Transmission Control Protocol/Internet Protocol (TCP/IP) manually because it must adapt to the environment automatically. In principle, TCP/IP protocols are designed to be robust enough to work in environments ranging from local-area networks with low error rates and low delay to satellite networks with higher error rates and extremely high delay.

Specific implementations of TCP vary in the extent to which they live up to that principle. A bad implementation of TCP/IP can behave so miserably that it stresses the underlying networks and calls immediate attention to the problem. A good implementation of TCP, on the other hand, works so well that it hides underlying performance problems enough for them to go undetected.

Because TCP/IP is both new and complex, most implementations have the same general problem: They work well for simple tasks, such as with a LAN using a single vendor's version of TCP, but under stress, for example, in a multivendor TCP network or a satellite network, they exhibit problems that are subtle and difficult to understand.

The easiest test of TCP performance is interoperability. When evaluating an implementation, test it against as many other implementations as possible. Some TCP/IP implementations can only talk to themselves. Others can interoperate but only perform well when talking to themselves.

One possible cause of lower performance can be excessive retransmissions. TCP uses a traditional acknowledgment-and-retransmission scheme, in which the receiver returns an acknowledgment for data it receives correctly. The sending TCP starts a timer after sending data and retransmits the data if the timer expires before the acknowledgment arrives.

Some TCP implementations use a fixed value for the retransmission timer. Such implementations are suitable for use over LANs that have uniform, low delay and high reliability. They perform poorly over networks that have high delay, which creates excessive retransmission.

Even those implementations of TCP that use an adaptive algorithm for estimating delays with a variety of network technologies do not always work well. In one example of poor adaptation, TCP starts with an estimate of round-trip delay that is too small.

Based on the incorrect estimate, TCP transmits data but then sets its retransmission timer too low, causing the timer to expire before the acknowledgment returns. When the timer expires, TCP incorrectly assumes that the data was lost and retransmits it. Then, just after TCP retransmits the data, the acknowledgment that had been traveling back arrives.

TCP incorrectly associates the acknowledgment with the retransmission and not with the original transmission. Thus, when TCP updates its estimate of round-trip delay, the new value it computes remains too small. The cycle starts over again, with TCP transmitting every packet exactly twice.

Inefficient use

Another frequent source of problems with TCP is software that does not make good use of the underlying network technology. An example of this would be an implementation that does not take advantage of the maximum packet size, or maximum transmission unit, permitted by the network and always sends small packets, which work but use network bandwidth inefficiently.

There are only two ways to detect such inefficiencies. One is to examine the TCP/IP source code to see how it selects size. The other is to monitor packet sizes on the underlying network.

Another problem associated with small packets is more subtle. It occurs because TCP uses a simplistic algorithm to control packet flow. With each acknowledgment, the receiving TCP tells the sender exactly how much buffer space it has available. The sender can transmit enough data to fill the receiver's buffer but must then stop until the receiver processes some or all of the data in its buffer and makes more space available.

Normally, an application on the receiving machine consumes data more quickly than the network can deliver it. If that is not the case, however, the receiving end of a TCP application consumes bytes of data slowly, allowing TCP to fall prey to the "silly window syndrome."

In this instance, the receiver specifies

Comer, a professor of computer science at Purdue University, is author of *Interworking with TCP/IP* and other books on operating system designs and networks.

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an extremely small amount of available buffer space, and the sender responds by transmitting an extremely small amount of data to fill it (sometimes one byte). The name "silly window" has been applied because transmitting such small amounts of data is a frivolous waste of network bandwidth.

From the user's viewpoint, TCP is working correctly; the problem can only be detected by monitoring traffic on the underlying network. The silly window syndrome is not something an end user can control; it can only be fixed by changing the way TCP works.

SOMETIMES abnormal behavior occurs not as a result of oversight or incorrect code but as a result of a well-intentioned vendor extending the protocols in an unusual way.

Sometimes abnormal behavior occurs not as a result of oversight or incorrect code but as a result of a well-intentioned vendor extending the protocols in an unusual way. Consider, for example, the procedure that one popular workstation vendor chose to have its diskless workstations use in booting.

First, the diskless client uses the Reverse Address Resolution Protocol (RARP) protocol to find its Internet address. Then the workstation assumes that whichever machine responds to its RARP request is its file server, and it tries to boot from that machine using the Trivial File Transfer Protocol (TFTP), the Internet standard protocol for file transfer with minimal capability and minimal overhead.

To make the system more robust, the vendor added one extra twist: If the file server does not respond to the boot request, the workstation begins to broadcast its TFTP request periodically until it receives an answer — presumably from a backup server. This process seems reasonable until it is used in an environment in which there is a backup RARP server but no backup boot server. In such cases, rebooting diskless machines while their file server is down — such as for monthly maintenance — causes the machines to spew out broadcast TFTP traffic that will never be answered.

Even one machine broadcasting periodically can be annoying, but imagine what happens if the server is down during a short power interruption, when all diskless machines begin emitting broadcast requests.

One of the few ways that managers have of tuning TCP/IP software is by adjusting network load. Aside from routes that are simply incorrect or routing tables that place too much load on one network, wild-card routing accounts for most of the problems encountered with TCP/IP.

Some managers assume that hosts do not need to route at all — they merely set a wild-card route in the host, directing it to send all packets to a gateway, sometimes called a router. Doing so keeps host routing manageable but can lead to poor performance, especially if the host does not implement the Internet Control Message Protocol part of the IP protocol (it should).

The best way to tell if wild-card routing is impeding TCP performance is to observe network traffic to see if the host routes all packets to one gateway, even when another gateway on the same network would be a better choice.

If that is happening, the first gateway will transmit some packets back across the same network to the second gateway. This is referred to as the extra hop problem.

As these examples show, no magic exists for tuning or evaluating TCP/IP software. Because the technology is new, many TCP/IP implementations contain subtle bugs that surface only under extreme conditions. Even the extensions of well-intentioned vendors can sometimes cause problems. Network managers need to be technically informed and alert to the interactions of machines in their environment. •

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Alternative?

CONTINUED FROM PAGE 87

the Corporation for Open Systems.

- The widespread adoption of the IEEE 802 series of protocols for LANs, which have also been adopted for OSI.
- The availability of products from DEC, HP, AT&T and Sun.
- The Government OSI Profile (GOSIP) that mandates use of OSI by government agencies starting in two years.

And when will OSI be ready? Leary says the networking management stack probably will not be finalized until 1991 or 1992. However, he notes, the lower level portions — the portions that get data across from node to node, those that service users and FTAM — are firm right now, and the few final ones will come in within the next year.

But few users seem to agree that these forces will lead to a rapid changeover to OSI. Kincl says HP expects to route both TCP/IP and OSI packets on its R&D network, and workstations will be able to run both kinds of applications.

Over time, Kincl says, hosts will migrate to OSI, "but nothing you are going to do will convince me to put a host on a new network just because it's an OSI network or to change all my hosts overnight. The change will have to be gradual. We'll have to have a network carrying both sets of traffic."

Other users say they see migration strategies that may lead to long switchover times. Rogers says that Chrysler, rather than running TCP/IP and OSI on the same networks, will connect TCP/IP and OSI networks through gateways, "unless the vendors force us to go the other way." According to Rogers, that will come in the next five years.

A June report from Cambridge, Mass.-based Forrester Research, Inc. confirms the impression that widespread conversion to OSI may not be as quick in coming as some believe. Forrester reports that of 48 Fortune 1,000 companies asked if they planned to migrate to OSI, 56% answered "No," and 10% said they were unsure.

This cautious approach to OSI may help create a golden age for TCP/IP — a not-so-brief flowering before it goes the way of all protocols. •

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Continued on page 92

Now some light to steer by

TCP/IP adds manageability beyond the network layer

BY DANIEL LYNCH

Transmission Control Protocol/Internet Protocol (TCP/IP) networks came into being with very little attention paid to network management tools. When it was only a research prototype, that was an acceptable situation. After all, the people running the research networks were fairly knowledgeable and could manage their networks on the basis of that familiarity.

TCP/IP's popularity has increased, however, and its circle of users now extends far beyond the early core of researchers. Newer users aren't interested in studying aberrant behavior on large networks; they just want to be able to use the network efficiently, which means they need real net management tools.

Until recently, such tools as were developed amounted mostly to extensions of what the wizards used when problems cropped up. While good for diagnosing a class of problems at the network layer, they also left a great deal unaddressed.

The big problems were concentrated in the gateways, or routers in Open Systems Interconnect (OSI) terminology. Congestion, routing loops and lost data had to be dealt with.

But users were also becoming concerned with tracking the health of all parts of their networks. The following list, which is by no means exhaustive, shows in OSI-layer style the variety of entities and related issues that are of interest to network managers.

- **Physical transmission media, such** as phone lines, Ethernet cables, broadband cables, token rings, satellite channels, fiber cables and repeaters for all of these.
- **Data links, consisting of** the above physical links with varying addressing characteristics, bridges among similar and dissimilar links, modems, transceivers and up/down status.
- **Network switching components, which include** network interface boards, X.25 boxes, routers and logical addresses for all these switches.
- **Transmission units, in terms of** packet throughput analysis and data integrity.
- **Session control, including** software management of application multiplexing and accounting control.
- **Presentation elements, such as** ASCII conversion, EBCDIC conversion, window management and data conversion among differing machine formats.
- **Application layer requirements,** such as security, accounting chargeback, locater directories for persons and services, software version management and many more items too numerous to mention.

Individuals assigned to oversee the operation of large, multivendor networks need a network management system that shows them the "inventory" they have to manage. They need a system that shows them the health of each item in the inventory. Then they need a system that shows the health of interactions among parts of the system. They need a system that predicts problems that are about to happen. And, finally, they then need a system that allocates resources according to both static and dynamic considerations.

No full solution is here yet, but after years of ignoring the problem, the TCP/IP community has finally proposed two approaches for network management.

The more expedient approach is the Simple Network Management Protocol (SNMP). SNMP takes a rapid, fire-fighting view of network management and does just the minimum needed to get a reasonable picture of the most pressing problems. It avoids some of the thornier issues, such as updating large tables of control variables in a coordinated manner. The SNMP approach has been documented and implemented and is available from a growing number of vendors.

The second approach is CMOT, or Common Management Information Protocol (CMIP) over TCP/IP. CMIP is a set of standards for the management of multivendor networks developed by the OSI community, which was much faster than the TCP/IP community in facing up to the need for network management.

The CMOT approach takes the long view and presumes that, in the future, users will be managing both TCP/IP and OSI networks, often in combination. The transition from SNMP to CMOT is made possible by having both sets of network protocols use the same database of variables — called the Management Information Base — to manage the network.

A dozen vendors are currently designing and developing CMOT-based products that they expect to solidify during the next six months and have ready for shipment shortly thereafter.

It will take many years before every product has a network management component built into it, but the design for that is in place. Interim solutions will find ways to glean much of the needed data from existing software and report it to the network manager in the new universal formats. Any solution should be able to accept inputs from old systems. •

Lynch is president of Advanced Computing Environments, based in Mountain View, Calif.

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The search for perfect project management

Too little R&D, too much design cause cost overruns, delivery delays

BY DIEN PHAN,
DOUGLAS VOGEL
and JAY NUNAMAKER

Much of an MIS director's work centers on managing software projects. However, in many shops, software development is plagued by failures, late deliveries and cost overruns.

MIS managers, therefore, find themselves continually trying to better manage and control software project development.

What works and what doesn't in today's software project management? To answer this and related questions, the MIS department at the University of Arizona in Tucson recently conducted a survey of MIS professionals.

Topics addressed by the survey respondents included a broad range of concerns, highlighted by the following:

- Project definition problems.
- Project planning and control attributes.
- Staffing and management of human resources.
- The effect of user feedback on project design and development.
- Reasons for cost overruns.
- Attribution for project delays.
- Use of project management tools and techniques.
- Actions taken to handle delayed projects.
- Strategies employed to coordinate and control resources.

Survey respondents in MIS answered questions anonymously about how they handled software project management and how successful they were. The survey methodology was basic (see story page 96), the results intriguing.

Furthermore, suggestions for improving project management become apparent from the survey responses and are provided following the results synopsis.

KAREN STOLPER

How MIS does it

The survey addressed the estimated actual and ideal percentage of efforts that the respondents devote to designated project activities.

In general, respondents said they spend too little time in early activities such as feasibility studies and planning — and ultimately in documenting — while they indicated that they spend too much time in design, system development, debugging and quality assurance.

As one project leader noted, "We are facing a turning point in the R&D area where poor planning has begun digging our grave."

The respondents reported that their project goals and objectives are more often better defined than problems and opportunities or the environmental

The authors are associated with the department of MIS at the University of Arizona. Phan is a Ph.D. candidate with corporate experience. Vogel is assistant professor of MIS. Numamaker is professor and head of the MIS department.

- **Caught between ambitious budgets, users**
- **Don't blame automation tools**
- **MIS scores high on technical expertise**

Who, what, how many, why?

The University of Arizona's software project development survey of MIS professionals followed a simple methodology. After a pilot test was completed, the survey was sent in November 1987 to 827 randomly selected members of the American Institute of Certification of Computer Professionals (AICCP). There were 191 returns, a 23% response rate.

Respondents included project leaders/managers (47%), technical professionals (37%) — programmers, analysts and consultants — and top executives (16%). All respondents had at least five years of data processing experience, in keeping with AICCP membership qualification procedures.

What are the characteristics of these software development projects? According to the respondents, projects referred to in the survey have an average of 17 team members and take an average of 102 man-months to complete for a duration of 14 months with an average cost overrun of 33%. Some 56% of the projects were single-team led by a project/team leader, and 44% were run by multiple teams. Projects were charged back to the users in 55.6% of the cases, with the remaining forms of finance focusing on no charge to the user (30.8%) or negotiated payment (13.5%).

According to the survey, initial planning of software development projects is predominantly the responsibility of the project manager or leader (50.7%), less often that of an ad hoc planning group (34.7%) or steering committee (20.3%) and rarely the responsibility of a planning department (9.4%). Totals in excess of 100% denote shared responsibilities.

Software development project objectives are typically set by top management (26.1%) or the project manager/leader with direction from the top (28.9%), from users (21.8%) or some combination (19.7%) and rarely by team members with input from users (3.5%).

DIEN PHAN, DOUGLAS VOGEL and JAY NUNAMAKER

interface of their software projects.

In other words, MIS personnel are often better at saying what they want than at defining the problem or describing where and how the project fits into their existing setups.

Further, MIS is generally better technologically than managerially, the respondents indicated.

In addition, although only 17.4% of the respondents said they felt the project leaders' technical skills were insufficient, almost twice that amount — 36.7% — indicated that they felt the software project leaders' managerial skills were insufficient.

Staffing requirements

And just who works on these software projects?

Examining concurrence with popular project team models such as those described by Harlan Mills in his IBM report, "Chief Programming Teams: Principles and Procedures," project personnel usually include a chief programmer/surgeon (85% of the respondents had a team member with this title), a co-pilot/backup for the chief programmer (57.5%), a business administrator (57.5%), document editor (42.5%), secretary (40.4%), program clerk (25.2%), toolsmith/system software support (63.8%), tester (56.7%) and programming language expert/lawyer (13.4%).

Many organizations, however, do not have all of these positions. As one survey respondent commented, "These are cute titles, but they are not meaningful to us . . ."

A New York test director further noted that "the chief programmer approach makes projects too dependent on one person. The other team members get too resentful of just being ordered."

According to the survey results, project staffing and management tends to be dominated by people with varied backgrounds and dotted with team-member specialists. Leader specialists are also common, the respondents noted.

Additional data indicated that project managers tend to be generalists and that relatively few organizations recruit people with programming backgrounds simply to fill project team positions.

Systems requirements, preliminary design, detailed design and progress reviews are commonplace in two-thirds of the organizations surveyed. Planning reviews are the only type of review conducted in less than half of the organizations. Progress reviews are most often held weekly and as required, the survey results indicated.

Feedback is generally communicated to project team members immediately and studied promptly. Furthermore, feedback that requires major changes is still often considered even after project design is frozen, although when discussing project cost overruns and late delivery of projects, the respondents noted that late changes might not be made if they will cause the project to fail.

In addition, the data indicated that management does not overly influence the promptness with which feedback is delivered.

The progress of software development projects is generally measured in terms of milestones, user acceptance of components and systems and subtask progress.

As one test director noted, "We use a build-a-little, test-a-little philosophy with many milestones."

In addition, only 2.8% of the respondents rely on thousands of lines of code to measure project progress.

How well MIS does

There are no magic formulas that can accurately estimate the size, cost and delivery schedule of software development projects. In fact, too often, project leaders and managers are caught in the middle of a conflict between budget, schedule and user satisfaction.

If project design must be frozen early during development to meet a schedule and budget, the finished systems may not be useful to users. But if frequent changes are subsequently allowed, the rate of changes will exceed the rate of progress and costs will exceed budget.

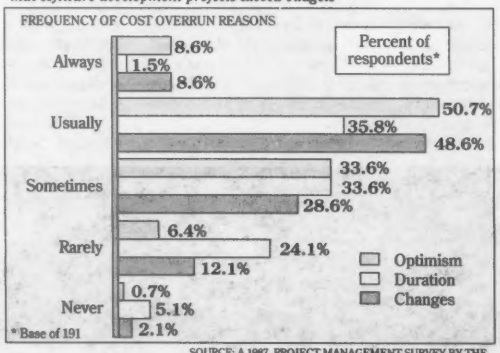
The challenge for MIS is to balance all resource constraints and still achieve maximum user satisfaction.

In this regard, the respondents to the survey were asked questions about user expectations, cost overruns and late deliveries.

Actions taken to combat late deliveries were explored and analyzed by the respondents in terms of effectiveness and impact. The results were quite

Why do projects cost so much ?

Unrealistic optimism and frequent changes are two big reasons that software development projects exceed budgets



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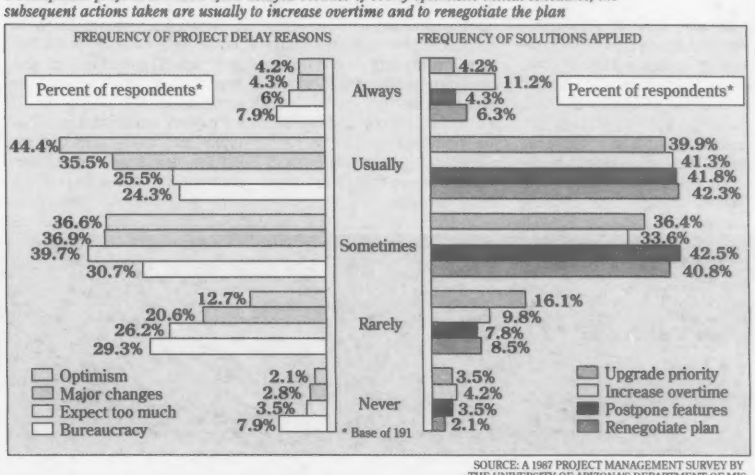
Why do projects run late, and what does MIS do about it?

Development projects are most often delayed because of overly optimistic initial schedules; the subsequent actions taken are usually to increase overtime and to renegotiate the plan



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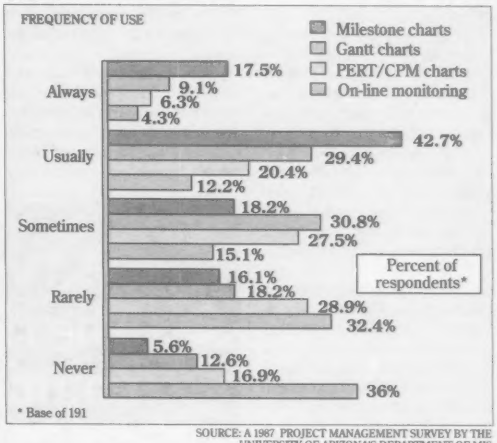
Tools of the trade

Milestone charts are used most often in managing development projects



SOURCE: A 1987 PROJECT MANAGEMENT SURVEY BY THE UNIVERSITY OF ARIZONA'S DEPARTMENT OF MIS
CW CHART

positive regarding the software planning and control efforts put into place for meeting user requirements and expectations.

Nearly three-fourths of the respondents reported that user requirements and expectations are always or usually met. Only 7% responded rarely or never. (It would be informative to compare this data with end-user perceptions.)

Based on analysis of the data, success in meeting user expectations is positively influenced especially by the degree to which the following occurs:

- Project leader possesses good management skills.
- Goals and objectives as well as problems or opportunities are clearly defined.
- Major changes do not occur during the design and development phase.
- Staffing is well balanced with minimal turnover.
- Feedback is communicated immediately and studied promptly.
- Quality assurance efforts are not reduced.
- Users and management are not forced to accept the situation if they do not wish to.

According to the respondents, success in meeting user expectations is not affected by the size of the project, the number of people working on the project, the duration of the project, understaffing, team members or leaders being specialists, managers being generalists or team members' programming background.

Cost overruns

Unfortunately, only 16.5% of the respondents' software projects rarely or never have cost overruns. Fully 41% always or usually do. Software projects, on average, overrun planned costs by 33%.

Why do projects go over budget? The reasons for cost overruns are summarized in the chart on page 96. Overly optimistic estimations and changes being made too frequently for estimation to be accurate both rate highly.

Overly optimistic cost projections can result from a combination of lack of knowledge and wishful thinking as well as political reality.

Development problems in terms of poor analysis and design and frequent changes in design and implementation are also cited by the survey respondents as areas needing improvement.

Frequent changes are noted as usual in nearly half of the projects. Optimistic estimation coupled with frequent changes in design and implementation is a particularly deadly combination of forces influencing cost overruns, the respondents pointed out.

Based on analysis of the data, success in avoiding cost overruns is positively influenced especially by the degree to which the following occurs:

- Steering committees and joint staff are employed to coordinate and control resources with the projects and organizational environment.
- Team members are specialists.
- Once project design is frozen, feedback that requires major changes is not considered for the current version.
- Project plans and schedules are subject to renegotiation.

OVERLY optimistic cost projections can result from a combination of lack of knowledge and wishful thinking.

- Features and upgrades are postponed until the next version.

According to the respondents, success in avoiding cost overruns is not particularly affected by the duration of the project, understaffing or managers being generalists.

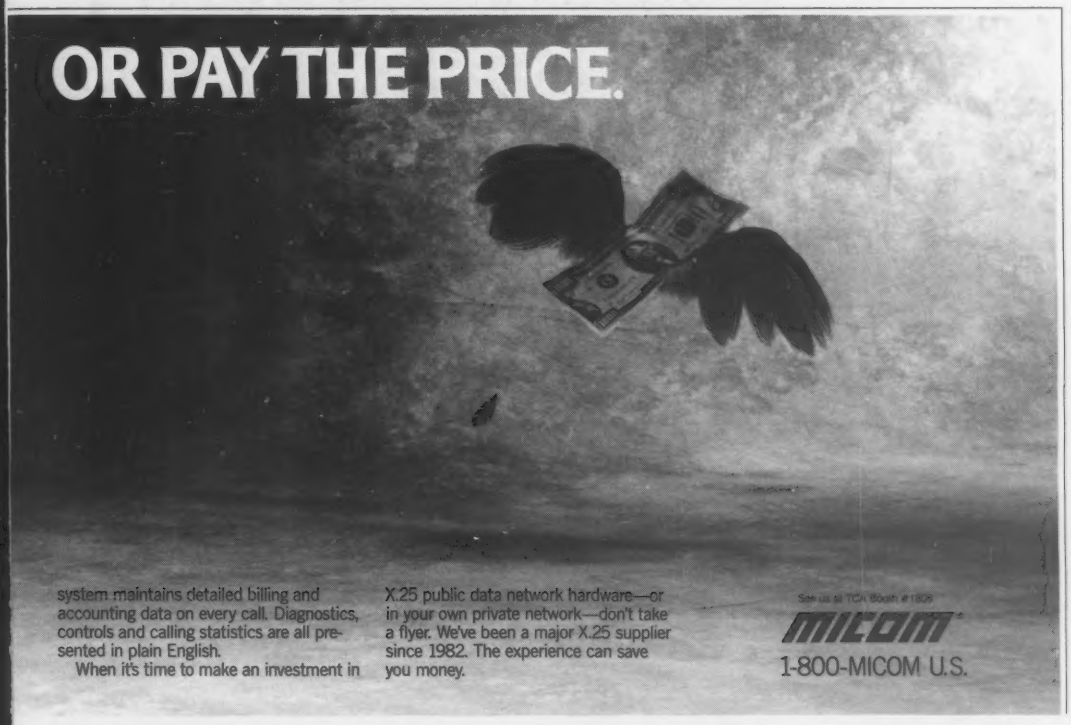
Project delivery

In general, delivery estimation becomes increasingly difficult as the complexity of the project increases beyond the experience and capabilities of individual analysts, leaders and managers.

Unfortunately, only 17.5% of the respondents' software projects are rarely or never delivered late, while 32.9% are always or usually late.

The primary reasons for project delay are illustrated in the chart above left in association with six areas: planning and management, project dynamics, user issues, organizational issues, software automation tools and project team issues.

From a planning and management perspective, overly optimistic planning is the dominant



reason given for project delays, as opposed to poor project management or ill-defined goals and objectives.

Project dynamics influencing project delays are mostly a function of major and minor changes rather than projects moving too slowly after a major portion is completed.

User issues provided by the respondents as major reasons for project delay are mostly based on lack of cooperation and inflated expectations, not on morale problems or lack of motivation.

From an organizational perspective, bureaucracy and lack of interdepartmental cooperation are identified as primary project delay reasons, with lack of management support noted only rarely. Lack of the availability and use of software automation development tools generally rarely contributes to project delays, the survey results indicated.

In addition, the respondents noted that rarely are existing software automation tools not sufficiently powerful and/or not user-friendly.

THE MOST common management approach taken to handle delayed projects is to upgrade the priority of the project.

Understaffing is the dominant project team issue associated with project delay. Team collaboration is listed as less of an issue, and excessive absence of project members is rarely or never cited.

As illustrated by the chart on page 97, actions taken to handle delayed projects fall into two general categories: management and modification. Management actions fall into two subcategories — management attention and work patterns.

• **Management attention.** The most common management approach taken to handle delayed projects is to upgrade the priority of the project, and the respondents noted this approach as effective.

Shifting part of the responsibilities and obligations to other groups or seeking power and coordination among related projects and departments are less typical approaches. These approaches are also noted not to be influential in reducing project delays.

• **Work patterns.** Increasing overtime is the most popular approach to combating project delays, and analysis of the data revealed that increasing overtime does, indeed, tend to reduce project delays.

Adding manpower, although a popular alternative, is not influential in reducing project delays, the respondents pointed out. One project manager noted that that is the "... worst thing to do but [is] often forced by management."

This, in part, confirms convictions that adding additional manpower is not particularly effective but does not confirm other notions that adding additional people to delayed projects only tends to delay the projects even further.

Finally, respondents seldom subcontract project components; that tack is generally considered noninfluential.

Based on analysis of the data, additional ways to achieve success in avoiding late deliveries using management techniques are positively influenced especially by the degree to which the following occurs:

• Project leader possesses good management skills.

• Project costs are paid by requesters or users — this occurs most often in the form of chargeback systems.

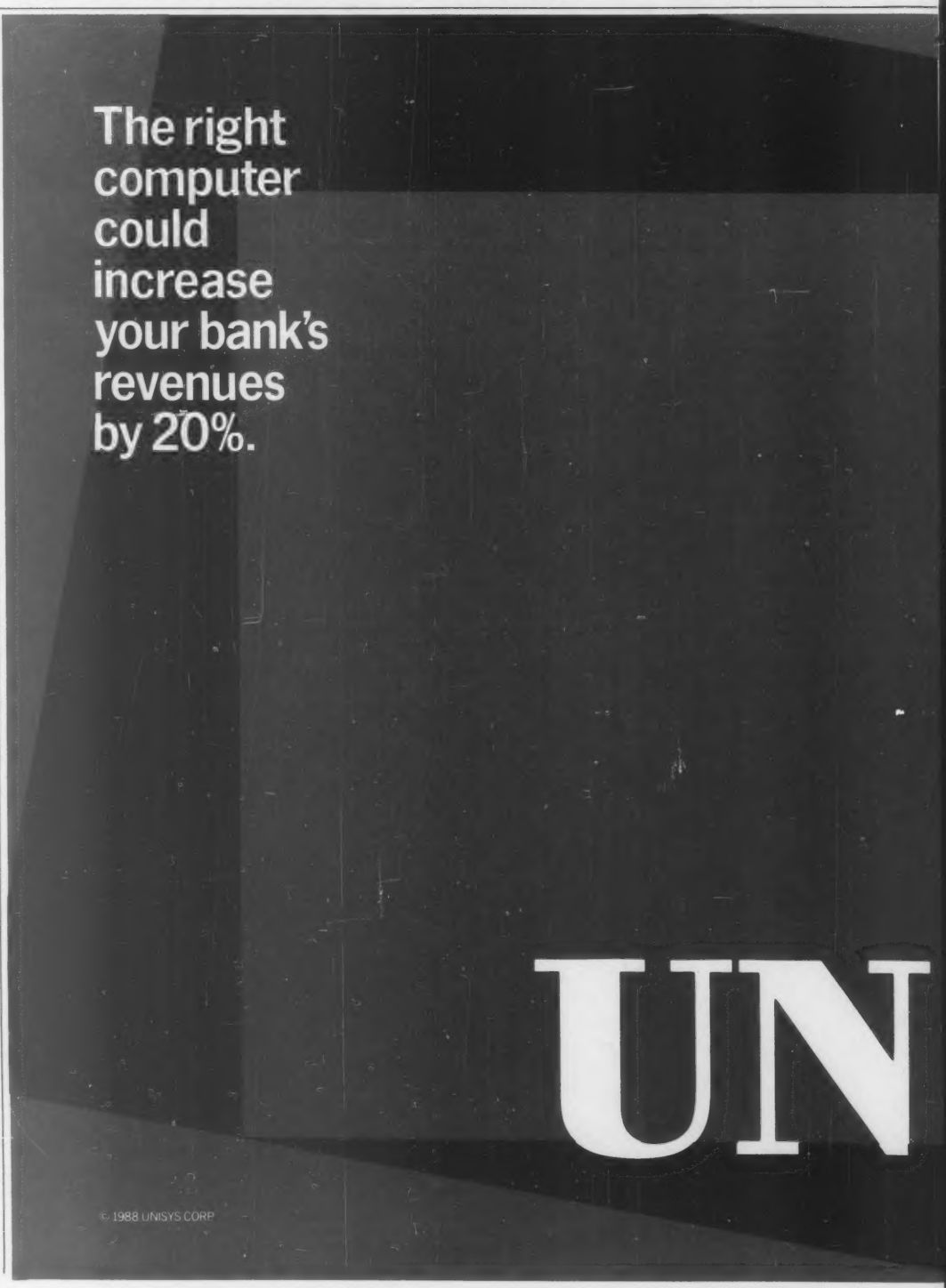
• Team members and leaders are specialists.

• Feedback requiring major changes is not considered after design is frozen.

• Communication and coordination problems are not present.

Modifying actions taken to handle delayed projects fall into two subcategories — project modification and implementation modification.

• **Project modification.** The typical approach taken to combat late delivery from this perspective is to postpone features and upgrades to the next



version. Interestingly, this has virtually no effect on reducing late deliveries but does have a positive effect in terms of avoiding cost overruns.

Canceling a portion of the project is rarely applied and is not influential in combating project delays.

• **Implementation modification.** Renegotiation of the project plan and schedule is the most popular action taken to handle delayed projects, according to the respondents.

However, data analysis revealed that while negotiation has a positive effect in terms of avoiding cost overruns, but it has no impact on project delays.

Reducing quality assurance efforts, persuading users or managers that they do not need all the features as initially planned and asking them to accept less desirable project features or terms or forcing them to accept the situation are less popular forms of combating delayed projects. These approaches also have a negative influence on handling project delays.

THE ADDITIONAL structure provided by brainstorming has been suggested to provide focus that results in group interaction effectiveness.

In other words, reducing quality assurance or asking users or managers to accept less tends to make matters worse — or doesn't work at all.

As one senior analyst pointed out, data processing "lacks political power in the organization."

Additional ways to achieve success in avoiding late deliveries through modification are positively influenced especially by the degree to which the following occurs:

- Goals and objectives are clearly defined.
- Attention is given to a good environmental interface.
- Major changes do not occur during design and development.
- Once project design is frozen, feedback that requires major changes is not considered for the current version.
- Quality assurance efforts are not reduced.

Project management tools

Among the respondents, a common interest in software project management is the availability, use and effectiveness of project management tools and techniques.

In addition, there is an interest in the applicability of generic techniques and tools as well as those designed more specifically for software project management support.

In the generic category, meetings are the most popularly used project management technique. Brainstorming, spreadsheets and use of databases to monitor progress are used to a lesser extent.

Popularity notwithstanding, using meetings as a technique for project management is not influential in ensuring that user requirements and expectations are met or that cost overruns and late deliveries are avoided, the respondents said.

Brainstorming, however, is an effective approach in all three categories. The additional structure provided by brainstorming has been suggested to provide focus that results in group interaction effectiveness.

Automated tools for brainstorming and other group activities, products that these days are called groupware, are becoming increasingly available to improve the efficiency and effectiveness of group interaction.

Spreadsheets are noted as particularly useful in ensuring that user requirements are met and deliveries are not late. Project management databases are noted as particularly helpful in avoiding cost overruns and late deliveries.

In terms of more specific project management tools and techniques, milestone charts are often used, much more so than

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The power of 2

Gantt charts (see chart page 97).

In addition, PERT/CPM charts and on-line software monitoring tools receive proportionally less frequent use, according to the respondents.

Only on-line software tool monitoring is noted by those who use it as universally helpful in terms of meeting user requirements as well as avoiding cost overruns and late deliveries.

Ironically, however, on-line software monitoring happens to be the least frequently used technique for software project management.

The more common tool approaches — milestone charts, Gantt charts and PERT/CPM charts — are generally useful in helping avoid late deliveries but are not universal in terms of helping meet user requirements and avoiding cost overruns. Gantt charts are noted as particularly ineffective.

Room for improvement

On the whole, the survey respondents indicated that they do not feel they are particularly effective in their use of software project management techniques and tools.

Ironically, those aids that are most frequently used are not universally effective and those that are particularly effective are poorly supported and seldom used. It is clear that numerous opportunities remain for the effective development and use of software project management techniques and tools.

Based on the findings and data analysis of this survey, some generally accepted good practices in meeting user requirements and expectations without excessive cost overruns and/or late deliveries can be suggested when managing software projects. These include the following:

- **Place more emphasis on managerial skills** for project and team leader selection.

Technical skills provide a sound foundation but managerial skills make the difference between success and failure.

- **Be clear and explicit** with respect to defining project problems and opportunities and environmental interfaces as well as goals and objectives.

Be especially aware that it is not sufficient to say only what you want — you need to know where you stand as well.

- **Use a steering committee and joint staff** to help coordinate resource use with other projects and the organization's corporate environment.

This technique can head off delays induced through bureaucracy and lack of interdepartmental cooperation.

- **Recruit project team staff from multiple backgrounds** and strive for a balance of specialists and generalists.

PROVIDE feedback immediately. Bad news does not get better with time. Bear it, manage it to get good results, and be ready to change with feedback — even if it is late in project cycles.

Note that specialists are particularly helpful in avoiding cost overruns and late deliveries.

- **Provide feedback immediately.**

Bad news does not get better with time. Bear the bad news, manage it to get good results, and be ready to change with feedback — even if it is late in project cycles.

- **Use project management tools and techniques** such as PERT/CPM charts and on-line monitoring to help avoid cost overruns and late deliveries.

But even if you use these techniques, be wary of expecting too much impact on meeting user requirements or expectations — it doesn't always happen.

- **Upgrade priorities and arrange for staff overtime** instead of adding manpower to handle delayed projects. The latter option is ineffective.

In addition, try not to reduce quality assurance or to force users and management to accept the situation — that is not particularly effective, either.

Overall, the software project management survey confirmed some suspicions, challenged some existing practices and noted some successes in meeting user requirements and expectations while managing cost overruns and handling late deliveries.

Implementing the above guidelines with particular attention to planning, managing, staffing, coordinating and user/manager communication might help. Unfortunately, however, the word on existing project management tools and techniques is not good, particularly in terms of helping meet user expectations.

In today's MIS departments, the opportunity clearly exists to develop and use more effective tools that better meet the extended needs of software planning management. •

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MANAGEMENT

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James Connolly

Certified wallpaper

Certificates are funny little bits of paper.

You need one to prove that you were born, although spy-novel fans know there is no way for immigration authorities to ascertain that the name on the birth certificate matches the face before them. Someone else needs a certificate to prove you are dead, although you'd think that the lack of a breathing body might be enough to satisfy a life insurance company.

Newspaper legend has it that a Boston reporter even pulled out a certificate attesting to her sanity so she could win her release from the mental hospital she was investigating from the inside.

In the MIS world, you don't need a certificate to prove your sanity, to get hired or to get promoted, but a lot of people spend an awful lot of time accumulating those same pieces of paper. Think of the last time you were at a professional conference in which there wasn't a promotion for accreditation — whether it was related to MIS or general business management. "Attend this session." "Take that course." "Earn credits toward this certificate."

Think hard and try to remember when you didn't hear about accreditation. It probably dates back to when a guy named Ike was in the White House.

Is certification worth the time and effort? Definitely, sometimes.

Some companies strongly encourage employees to earn certificates attesting to their professional competency. But interviews with MIS executives and placement specialists [CW, June 6] revealed that few companies require certification for MIS positions and that many companies just don't care about the whole process. So why did a stream of telephone calls come into *Computerworld* as MIS professionals sought more information about the various certification programs mentioned in that article?

They probably called because they're professionals who

Continued on page 105

Dynamic bank CIO puts technology in its place

BY JULIE PITTA
CW STAFF

Tor Folkedal brims with energy.

First Nationwide Bank's chief information officer jumps from his chair to show visitors the new video created to ease any apprehension on the part of the bank's less sophisticated computer users.

In mid-video, he runs to the door to greet his wife and teenage son, who have been on a back-to-school shopping expedition. He takes a peek at their purchases and introduces them to his guests, who are sitting in the screening room, before seeing the two off on their way home.

The video has not ended and the lights have not come back on before Folkedal is leading his visitors to a display case in his adjoining office to show off mementos from his international travels.

A visit with Folkedal becomes a study in perpetual motion.

Folkedal's energy has likely helped him through First Nationwide's transition from a small bank with about $11 million in assets when he joined in 1986 to a bank three times that size today. The bank's growth is largely due to acquisitions; it has swallowed up five other lending institutions in the last two years.

When Folkedal walked through the doors of his new office in San Francisco's financial district in the winter of 1986, he saw a challenge. What others might have seen could be aptly described as overwhelming.

"A 100% technology change is the buzzword here," Folkedal

Continued on page 106

PROFILE
Tor Folkedal

Position: *Chief Information Officer, San Francisco's First Nationwide Bank.*
Mission: *To be a banker and a manager first — and then deal with the technology — as he builds up an MIS group to support threefold corporate growth.*

SHOP RENOVATION

When the walls of MIS come a-tumblin' down

HAL MAYFORTH

BY DAVID GABEL
SPECIAL TO CW

How can you operate a data center when they're tearing it down around you?

Indeed, why on earth would you want to renovate a data center in the first place? It would seem easier to just build a new one and then cut over to the new operating site at the appropriate time.

"They have a death wish," says Tom Lalor, a partner at St. John's Consulting Group in Westfield, N.J. "But really, [companies] often have to renovate instead of move, because they are forced by a change in technology or by space constraints."

Robert C. Walsh, MIS director at Schwinn Bicycle Co. in Chicago, has moved data centers as well as renovated some while keeping operations going. "Moving a computer room is easier than building a computer room when you're operating in it," Walsh claims. "I've done both, and neither is easy. But you learn each time. Next time, I think I'm gonna get it right."

Users and consultants who have gone through the experience of renovating a data center unanimously agree that it is a unique challenge. It takes careful planning, and the assumption is that the originator of Murphy's Law was a data center manager who had to renovate his center while it was still operating.

"It takes lots of planning and coor-

Continued on page 104

Execs cite MIS benefits

DEC survey says operations and finance aided

BY JAMES CONNOLLY
CW STAFF

Senior managers in U.S. corporations increasingly recognize the benefits that computer technology can have for them, particularly in making their organizations more flat by cutting out levels of the corporate hierarchy.

The greatest of these impacts have been in the areas of operations and finance. Computers have improved communications within organizations and have helped reduce product lead times.

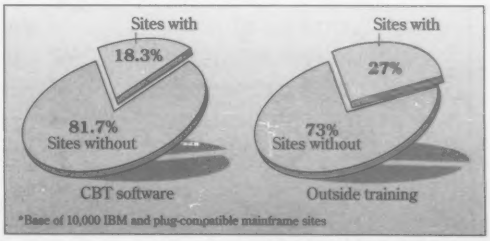
These findings were cited in a recent study commissioned by Digital Equipment Corp., which hired The Roper Organization to poll 320 chief executive officers, chief operating officers and vice-president-level strategic planning executives within large companies.

Continued on page 106

Data View

Basic training

A relatively small portion of sites reviewed currently use computer-based training software or outside training services*



*Base of 10,000 IBM and plug-compatible mainframe sites

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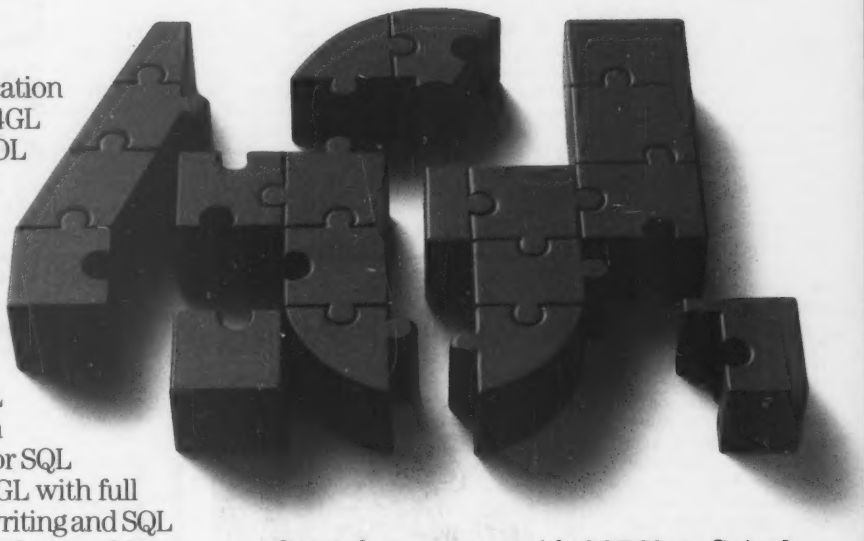

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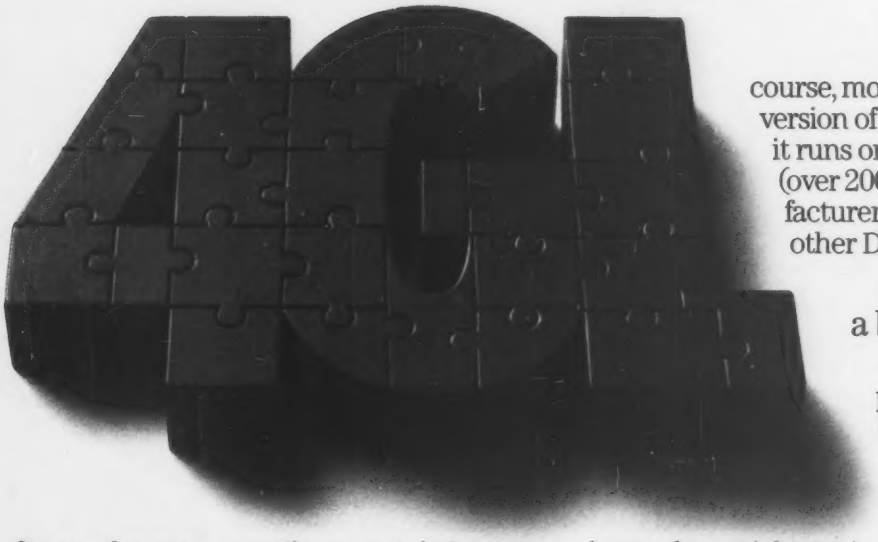

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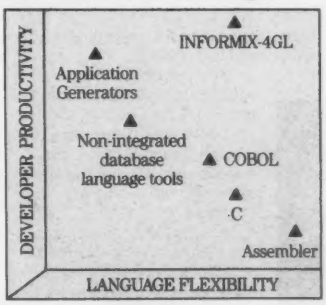

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MANAGEMENT BRIEFS

DPMA honors Noxell, two colleges

The **Data Processing Management Association** (DPMA) and its affiliate, the DPMA Education Foundation (DPMA-EF), recently honored two colleges and one corporation in their Joint Awards Program.

Black Hawk College in Moline, Ill., was named the recipient of the two-year education program award, and **California State Polytechnic University** was cited for its four-year educational program.

Noxell Corp. in Hunt Valley, Md., was honored as an industry participant.

The program was designed to improve data processing education and to expand the role of industry in the information systems educational process.

The schools were honored for their use of the DPMA Model Curriculum, faculty activities and background, student enrollment, graduate placement and DPMA Student Chapter involvement. Noxell was honored for its involvement with DPMA and DPMA-EF, employee participation, opportunities for continuing education for information systems professionals and involvement in cooperative educational programs.

The winners will receive plaques Oct. 30 in conjunction with the DPMA Computer Conference in Dallas.

Job shuffling is going on out West. Average annual data processing staff turnover rates on the West Coast have jumped from a low of 7% only 18 months ago to 12%, according to a regional survey conducted by **Edward Perlin Associates, Inc.**, a New York-based firm specializing in compensation management.

Perlin Associates also found the West Coast overtaking the Northeast as the region with the greatest demand for experienced technical experts, largely because of high-technology activities in the Silicon Valley area.

The West Coast lags, however, in salary growth, according to Perlin Associates. The research found that data processing salary growth averaged only 4.7% during 1987, compared with a 6.1% average in New York.

Perlin Associates staff member Peter Tamblyn noted that West Coast employers rely less on flexible compensation, such as bonuses, than their East Coast counterparts. But he said that if demand heats up, West Coast companies may increase their use of incentive pay.

If you are faced with managing the implementation of a computer-aided design and drafting (CADD) system, be ready to spend plenty of money, according to a survey of 300 companies conducted by the "Professional Services Management Journal" in Newton, Mass.

The median start-up cost reported by the 300 companies came to $163,100 for hardware, software and training, with the cost of mainframe- and minicomputer-based systems coming in at four times that of personal computer-based CADD systems. The median operating cost was $47,775 per year.

However, 72% of the respondents said their current investment in CADD has been profitable, with the greatest benefits being reported by companies that used CADD systems for more than drafting.

The deadline for entries in **The Institute of Management Sciences** (TIMS) International Franz Edelman Award Competition is Oct. 3.

The organization of scientists, educators and management professionals offers a total of $10,000 in prize money for papers detailing the ways in which organizations use management science to realize measurable benefits.

One- to two-page abstracts detailing the accomplishments should be sent to Competition Chairman Elden Thomas at McDermott International, Inc., Operations Research Department, 1562 Beeson St., Alliance, Ohio 44601.

Finalists will present completed papers at the TIMS national meeting, set for May 7-10, 1989 in Vancouver.

Sponsors of **Interex 1989**, a conference for users of Hewlett-Packard Co. computers, are soliciting papers for the Sept. 11-15, 1989 event in San Francisco. The conference theme is "Managing the Vision," and papers are due Jan. 15.

Business systems abstracts should be sent to Lou Gorewitz, P.O. Box 61745, Sunnyvale, Calif. 94088.

Technical systems abstracts should be addressed to the attention of Stephen Gauss, U.S. Naval Observatory, Astronomy Department, 34th and Massachusetts Ave. N.W., Washington, D.C. 20392.

The walls

FROM PAGE 101

dination with a lot of people," says Tom Rodriguez, manager of data center operations at the New York University Medical Center in New York.

When the medical center decided to renovate its data center, a renovation that involved installing water and electrical service, moving equipment, installing structural supports under the floor as well as a new floor — and then installing an IBM 3090 mainframe — Rodriguez became project manager.

"Even though you've agreed that some particular thing will happen, someone has to be there to see that it does," he says.

"The systems are up and running, [but] someone can just yank a cable, not knowing what he's doing. So the more you educate the [tradespeople who will be working in the data center] and make them sensitive to your needs, the better off you are."

Every renovation is different, of course, but two main hazards are always present: Dirt and dust come from any demolition, such as wall or floor removal, and can bring operations to a screeching (literally) halt.

In addition, electrical service interruptions can halt operations quietly but no less seriously.

The dirty work

There are two things you can do about dirt: erect temporary plastic walls to keep the dirt confined in the work area and make sure that air-conditioning systems don't suck dust into the working computer areas.

"We had lots of plastic walls," says Nick Avignone, a computer systems officer at the International Monetary Fund in Washington, D.C. He was one of two project managers for the Fund's recent data center renovation. "There were paths through the construction area where operators could run up and mount

Kling-Lindquist's Ralston

tapes and so forth. It was a mess."

In addition, he says, "we had to keep the air conditioners balanced so there wouldn't be negative pressure in the computer areas. We only had one problem with negative pressure."

They solved that problem, essentially, by finding it quickly and having manufacturer's representatives change filters and data center personnel carefully vacuum the dusty area.

Electrical power interruptions are of two kinds: planned and unplanned. "We planned scheduled outages months in advance," Avignone says, "and informed the users so they could plan. We had one unplanned power outage, and on-site vendor personnel brought our drives up when they went down."

Unplanned power outages can come from a number of causes — from unplugging a cable that shouldn't have been unplugged to accidentally disconnecting a service panel. All you can do is make sure that your recovery plans are adequate and implement them quickly when such a shutdown happens.

Vibration — yet another hazard — may be a problem, depending on the renovation job. "When we removed some concrete to change a floor level," Avignone says, "we had some vibration, but it wasn't a problem, just an annoyance to the people in the data center. The contractor did it at night." If there is sufficient vibration to cause problems with disk drives, then you might have to shut them down to allow the work causing the vibration to proceed.

However, according to Chip Ralston, a principal at the Philadelphia, Pa.-based Kling-Lindquist Partnership, Inc. architectural firm, in many cases you can ask the building contractor to

Schwinn's Walsh

place monitors to assure that vibration does not become too severe.

Expect the unexpected

The key to any renovation job, consultants and managers agree, is planning for the unexpected. Ralston at Kling-Lindquist, which did the design of the new data center for the International Monetary Fund, explains that his firm conducts a risk analysis with the data center and its hardware suppliers.

"We go to the point where we have developed the design criteria down to where the equipment will be," he says. "Then, we take the design through a complete risk analysis, involving people from the data center, facilities, the contractors and anyone else involved." The organization finalizes the effort and comes up with an integrated plan that delineates specific lines of responsibility.

"The risk analysis was a brainstorming session that went on for about a week," Avignone explains. It produced a document of more than 50 pages that Avignone used for network planning and task planning.

Still, unless you know what specific areas you should consider, it may be tough to make a plan. St. John's Lalor offers the following practical guidelines:

- Make sure disaster recovery plans are up-to-date and that they work.
- Plan to build in isolated areas and then cut over to operations in the recently completed space.
- Provide close supervision of the tradespeople, who may be strangers to data center environments.
- Prepare the site itself. This involves labeling valves, cables, switches and other equipment, which, if shut off or disconnected, would cause problems.
- Ensure that preventive maintenance is up-to-date. If some construction activity damages equipment, don't get caught with the vendor maintenance people saying that they must first bring preventive maintenance up to specification.
- Alert system vendors to the renovation and solicit their participation, which can make life a

St. John's Lalor

lot easier during the process. Many vendors will be happy to assist.
- Don't take on inexperienced contractors for the renovation work. Talk to the contractors' former data center renovation customers to make sure the contractor knows what he is doing. MIS must have input in the selection of a contractor.

Renovating a data center may be ideal for those people with a death wish, but sometimes it is necessary.

Careful thought about what can go wrong — including a thorough plan that takes disasters large and small into account — as well as close supervision will make it easier.

"Make the most obnoxious lists of problems you can think of," suggests Schwinn's Walsh, "and then have someone check on every one of them. And don't trust anyone."

Gabel is a free-lance writer and a former data center manager based in Northport, N.Y.

CALENDAR

OCT. 2-8

Conference of the Association of Field Service Managers International. New Orleans, Oct. 2-5 — Contact: Association of Field Service Managers International, Suite B, 6361 Presidential Court, Fort Myers, Fla. 33907.

Honeywell Bull Users Meeting. Phoenix, Oct. 2-5 — Contact: HLSUA, 8th floor, 4000 Town Center, Southfield, Mich. 48075, or North American Honeywell Users, P.O. Box 2037, Willingboro, N.J. 08046.

NRMA Retail Information Systems Conference. Washington, D.C., Oct. 2-5 — Contact: National Retail Merchants Assn., 100 W. 31 St., New York, N.Y. 10001.

Lasers in Graphics/Electronic Publishing in the '80s Conference. San Diego, Oct. 2-6 — Contact: Lasers In Graphics, 1855 E. Vista Way, Vista, Calif. 92084.

Oracle International User Week. Orlando, Fla., Oct. 2-6 — Contact: Oracle Corp., 20 Davis Drive, Belmont, Calif. 94002.

OS/2 and the Connectivity Promise. Santa Clara, Calif., Oct. 3 — Contact: International Data Corp., 5 Speen St., Framingham, Mass. 01701.

DB2 Tools Symposium. San Francisco, Oct. 3-5 — Contact: Digital Consulting, 6 Windsor St., Andover, Mass. 01810.

National Communication Forum. Chicago, Oct. 3-5 — Contact: Robert M. Janowiak, Executive Director, National Communication Forum, No. 739, 303 E. Wacker Drive, Chicago, Ill. 60601.

Comten Users' Exchange Conference. San Diego, Oct. 3-7 — Contact: NCR Comten, 2700 Snelling Ave. N., St. Paul, Minn. 55113.

Interchange 88, Concurrent Computer Corp. Users Group Annual Conference. New Orleans, Oct. 3-7 — Contact: Patti Brown, Interchange Administrator, 106 Apple St., Tinton Falls, N.J. 07724.

Technology Trends: A Management and Planning Perspective. New York, Oct. 4-5 — Contact: Brandon Managing Information Programs, One Harmon Plaza, Secaucus, N.J. 07094.

Buscon No. 6 - 1988: The Bus/Board Users Show & Conference. New York, Oct. 4-6 — Contact: Technical Program Coordinator, Buscon/88-East, c/o CMC, Suite 201, 222 Fashion Lane, Tustin, Calif. 92680.

Electronic Imaging Conference East. Boston, Oct. 4-6 — Contact: MG Expositions Group, 1050 Commonwealth Ave., Boston, Mass. 02215.

Managing High-Speed Trading Floor LANs. New York, Oct. 5 — Contact: Waters Information Services, P.O. Box 2248, Binghamton, N.Y. 13902.

EDI Workshop For Motor Carrier and Shipper Managers. Atlanta, Oct. 5-6 — Contact: Management Systems Council, American Trucking Associations, 2200 Mill Road, Alexandria, Va. 22314.

Optical Disk: Strategic Impact on the Engineering Environment. Oak Brook Hills, Ill., Oct. 5-6 — Contact: Robert J. Kalthoff, P.O. Box 8931, Cincinnati, Ohio 54208.

Association of Banyan Users International Fall Conference. San Francisco, Oct. 5-7 — Contact: Jennifer Kerr, Association of Banyan Users, 75 Union St., Sudbury, Mass. 01776.

Conference on Marketing Information Security Products and Services. Arlington, Va., Oct. 5-7 — Contact: Frost & Sullivan, 106 Fulton St., New York, N.Y. 10038.

Connolly

CONTINUED FROM PAGE 101

want to continue their education and improve themselves even after entering the job market.

They probably called because there can come a time when the tangible proof of educational credits and a certificate will make the difference as two apparently well-matched candidates go head-to-head for a job opening.

Finally, they may have called because they live with the belief that a piece of paper, whether it is an advanced degree, a letter of recommendation or a professional certificate, says that the bearer is a quality employee.

There may be a contradiction apparent in the last few paragraphs, but don't be concerned. It was intentional.

An employee at any level of any profession who spends his life building up paper credits cannot be a company's most valuable worker if he doesn't also produce on the job. The paper, standing alone, is meaningless.

Almost anybody in the work force can think of an example of an overcredentialed, underqualified person hired ahead of several experienced and capable workers. This is the case when the boss says, "Well, he does have an MBA. . . ."

Other end of the spectrum

At the other end of the spectrum is the long-term worker who figures that putting in his time and doing a capable job qualifies him for the next promotion or prepares him for the next level of challenges in his profession.

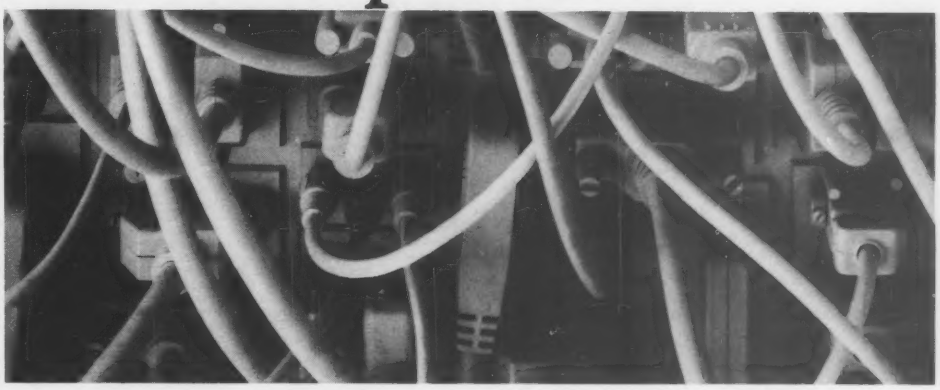
The latter aspect — being ready for new challenges — is particularly crucial in the dynamic world of MIS, in which the winds of technology and business shift almost weekly.

As with so much in life, the ideal lies somewhere in the middle. Certification, or at least continuing education, is vital — but only when teamed with quality day-to-day work, the ability to work with other people and a desire to excel.

For that reason, the companies that encourage employees to continue their educations stand to benefit, but only if the focus is on improving the employees — keeping them up to date on technology, building their communication skills and preparing them for advancement — rather than accumulating enough certificates to wallpaper their offices.

Connolly is *Computerworld*'s senior editor, management.

Beat those multi-vendor technophobia blues.



The symptoms are easy to spot.

You approach your exec V.P. with an information proposal. I's dotted, T's crossed. Everything's buttoned-up, right down to the last byte.

He's impressed, but maybe a little overwhelmed by all those vendors.

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Bank CIO

CONTINUED FROM PAGE 101

says. "Obviously, the systems that are appropriate for a small bank aren't the same for a bank the size of First Nationwide today. It's been an interesting project. It's not many companies that say they're going to buy all new equipment."

Before Folkedal could begin tackling any purchase or installation of new equipment, he needed staff. "There were very few technical people here," he says. Today, he oversees 293 full-time staff and about 50 temporary employees. Once he had enough technicians on board, the project began in earnest.

In 1986, First Nationwide's Unisys Corp. mainframe was already overtaxed by the amount of information that needed to be stored and disseminated. It would probably have vaporized into a mushroom cloud if it had to contend with the growth that was to come.

With the acquisition of five other savings and loan institutions, the bank's assets have grown, along with its staff and the number of locations from which it operates. When Folkedal arrived, First Nationwide had 253 branches, all in California. Today, it has 822 branches spread throughout 39 states. While the bank had no automated tellers in 1986, now it has more than 360.

Folkedal was given a capital budget of $27 million. With it began deliveries of Digital Equipment Corp. minicomputers, IBM and Tandem Computers, Inc. mainframes and personal computers.

Installation of systems has continued. "We're putting in a new system almost every month," Folkedal says. Part of his job has been to be a pied piper of computer technology, enlisting people throughout the bank to help with the project.

"The users don't all report to me, and they're very busy," he explains. "I have to ask them to devote their best people for many months to receive these systems. I have to convince them to spend time on weekends and holidays to install them. The best time to install a computer system is not on a Thursday."

Once a system is installed, he shows branch users the value of it. "New things are threatening," he says. "I have to sell them the idea that this thing will help and that change is good. Technology shouldn't be a threatening thing; it should be an enabling thing."

Ironically, the pied piper of technology professes to know little about computer technology himself. "We have a PC at home," Folkedal says. "It's of minimal interest to me. My son is much better at it than me."

Folkedal calls himself a hybrid. While he has been a banker for 25 years, he has only spent the last 10 years managing banking systems. He signed on with Crocker National Bank in 1978 as manager of systems development.

"When I was hired at Crocker, I told the technical staff, 'Throw me out if I start talking your language,' " he recalls. "I speak the language of management. I should be an interpreter."

Rising to the top

By 1986, Folkedal became a senior vice-president at Crocker. Shortly, he was approached by First Nationwide to be the bank's first chief information officer.

"They couldn't just have a DP manager," he explains. "They needed a member of senior management." Folkedal was drawn to the job not only because of the challenge but by the attitude of First Nationwide's executive team. "They understood that if you're going to do things in the financial services in the 1980s, you better figure out how your systems fit in and get on with it.

"Increasingly in the financial services industry, information is what we sell, move and deal in," he says.

Although most would say that Folkedal has earned a breather, none is in store in the near future. His next job will be to build a data center at First Nationwide's new headquarters in Sacramento. First Nationwide has grown out of its San Francisco location, and Folkedal says that they are spread all over town.

Folkedal pulls out a map and points to the site of the new data center in Sacramento. As he talks about the move, he exudes excitement. "I'm proud of this bank's ability to change," he says.

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1. On an Official Entry Form (or a copy), clearly print your name, title, company, name, address, zip code, business telephone and fax numbers, and fill in the five networking topics you're most interested in. ***All information must be provided in order to qualify as a contestant.*** You are not required to register for Communication Networks to enter the contest. If you win after you have registered, you will receive a full refund.

2. Mail Entry Form to: Communication Networks, "See The Communications World" Contest, P.O. Box 9171, Framingham, MA 01701-9171. Be sure to affix postage.

3. All entries must be received by midnight, November 15, 1988. Contest drawing will be held November 30, 1988. Communication Networks is not responsible for entries delayed, late, mutilated or lost in the mail. Odds of winning depend on the number of entries received. ***Only one entry per person.*** Entries become the property of Communication Networks.

4. One (1) First Prize, one (1) Second Prize and one (1) Third Prize will be awarded. Winners will be selected at random. All prizes will be awarded, and winners will be notified by phone. Only one prize per individual. Prizes are non-transferable and no substitutions or cash equivalents will be allowed. Winners will be required to provide consent for use of their name and picture in advertising and publicity.

5. The contest is open to residents of the continental U.S. and Canada, 18 years of age and older, except employees of International Data Group, its agents, affiliates and subsidiaries. This offer is void where prohibited, and subject to all federal, state and local laws.

6. Contest is sponsored by Communication Networks, which is produced by IDG Conference Management Group, an International Data Group Company. For a list of winners, enclose a stamped, self-addressed envelope with your Entry Form.

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Benefits

CONTINUED FROM PAGE 101

The study examined executive attitudes regarding computers and the use of computer technology within organizations. Ed Kamins, DEC's manager of corporate communications, said the results support DEC's belief that computer vendors must open dialogues with senior management.

Kamins, acknowledging that in some cases executives "said what they were expected to say," noted he was surprised that 98% said the use of information technology was of value to them. "When we talked to these people in the past, there was a sense that they were not involved with computers," he said, adding that executives may be responding to the 1987 stock market crash by demanding that they see benefits from their investments in technology.

The survey also showed that the responding companies spent an average of 5% or more of their operating budgets on computer-related resources, with 15% of the companies reporting that they spent more than 10% of their budgets on such items.

COMPUTER INDUSTRY

INDUSTRY INSIGHT

Nell Margolis

Pop goes the industry

"It's the end of the world as we know it;
It's the end of the world as we know it;
It's the end of the world as we know it;
And I feel fine."

Rock group R.E.M.

Well, it is, and I do, and here's why: Massachusetts has a shot at making it to the White House, the Sox have a shot at making it to the series, and the computer industry is finally making it in America.

Making it, you say? *Making it?* We're talking about one of the largest industrial sectors in the country, right in there in the oil and automobile neighborhoods. What do you mean, making it?

What I mean, of course, has nothing to do with commercial acceptance or even with money; I mean making it where it counts. I'm talking about making it in popular culture. Which, until recently, this industry conspicuously hasn't done. Technology has found its place in — even in the highest reaches of — corporate culture. There's even been a respectable amount of seepage into common parlance (don't simply take my word on this; interface with a few compatible friends and process their input.)

But mere acceptance doth not gut-level assimilation make.

Continued on page 110

Survivor amid change

IN PERSON

In more ways than one, William G. McGowan, chairman and chief executive officer of MCI Communications Corp., is a scrappy survivor. He took a company with a small microwave network from the brink of bankruptcy and turned it into a $5 billion long-haul communications company with a 10% market share, battling AT&T at every step.

He has also battled back from a December 1986 heart attack and subsequent heart-transplant operation (CW, April 1987) to regain excellent health. *Computerworld* Washington, D.C., correspondent Mitch Betts spoke with McGowan shortly after MCI's 20th anniversary at MCI headquarters in Washington.

Does the 20th anniversary have any special significance for you?

It is significant in the sense that we are the oldest entity in our industry that has stayed the same. Everyone else has been split up, merged, sold out, combined. We have the same company and the same management, so in many ways we're the old-timer in the industry.

MCI's McGowan

We are fortunate in that our industry ... is growing every year at a fairly high rate, nearly 14% compounded growth in usage [of interstate and international lines]. That's why the industry can have 35% price cuts and yet it has never had a drop in revenue. It's growing so much that it just overwhelms the decrease in prices.

Does your marketing relationship with IBM help crack the large-user market?

It is a very small number [of customer projects] on which we're working together. But the relationship with IBM is helpful because it shows the executive officers of those companies — vs. the telecommunications people — that MCI can handle their telecommunications needs.

However, a lot of communications and MIS purchases are still reported up through the chief financial officer, and that's about as conservative an executive as you can find. Even under the chief information officer concept, almost 70% of CIOs still report to the CFO. So it is slow to change.

Continued on page 116

HP toxic fine may total $16M

BY J. A. SAVAGE
CW STAFF

CUPERTINO, Calif. — The chemicals Hewlett-Packard Co. uses in manufacturing are coming back to haunt it.

The state of California filed a lawsuit two weeks ago against HP concerning the way it handles its toxic wastes. The company faces a potential fine of as much as $25,000 per day in violations, or more than $16 million. The state charges that HP was in violation in December 1986 and may have been since.

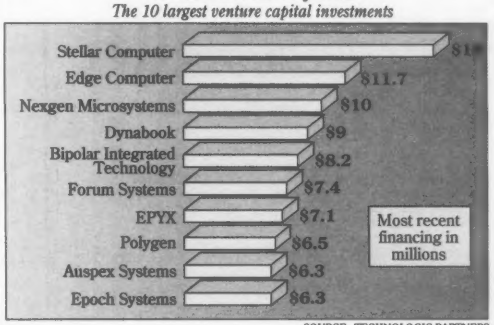
The state's Department of Health visited the site three times in December 1986 and January 1987 and found 23 violations of law, according to Marga-

Continued on page 109

Data View

Where the money went

The 10 largest venture capital investments



SOURCE: TECHNOLOGIC PARTNERS
CW CHART

Datapoint in black for six

SAN ANTONIO, Texas — Continuing its fight back from three years in the red, communications pioneer Datapoint Corp. last week reported $330.8 million in revenue and $8 million in net income for its fiscal year 1988, ended July 30.

Revenue for the year was up slightly from $312.1 million in fiscal 1987, while the profits picture contrasted sharply with last year's reported net loss of $57.8 million.

Net income for the fourth fiscal quarter was $2.6 million, an apparently disappointing slide from $8.1 million in last year's comparable period. However, Datapoint Treasurer Robert Hunt said the disparity stems from extraordinary inflation of profits in the 1987 fourth quarter as a result of a major corporate restructuring.

In a prepared statement, Chief Executive Officer Robert

Continued on page 113

Inside

- Fall of a Norsk star. Page 110.
- Honeywell warns of losses to come. Page 108.

Brownlee puts shoe on right foot at Walker

BY NELL MARGOLIS
CW STAFF

Walker Interactive Systems is a company whose time appears to have come — again.

The San Francisco-based consulting firm-turned-software house was pointed straight at success back in 1981, when it roared into the market with a particularly customizable line of high-end financial software that both users and market analysts agreed was conceptually years ahead of its time. Poised on the brink of a bright future, the company made a series of missteps — hyperexpansion and half-baked production — that caused it to plunge into debt and face the possibility of no future at all.

Walker Chief Executive Officer David Brownlee said he sees the company's stumble as stemming in no small part from early '80s trends in venture capital.

"Back then, 'entrepreneur' was the magic word," he said. "Venture capitalists were throwing money at any company with a good idea without asking any questions." Walker, high on the concept of portable applications and the potential of the Software Bridge, its own internally developed tool for building them, was not about to turn its back on the virtual giveaway. The company that had spent 12 years as a consulting firm raised $21 million in venture capital for its first foray into the commercial software market.

Funded to the hilt, Walker went haywire. "They expanded much too quickly and on top of an idea that was technologically brilliant but not very well-executed," said market analyst and consultant Vaughn Merlyn, who served as a consultant to Walker during its transition into the packaged software market.

Walker's Brownlee

"We had a good seller," Brownlee said. "We just didn't deliver it. The market sprung prematurely, and we sold what we hadn't finished testing yet. Bugs resulted from products thrown out the door too early."

The mainframe-level financial applications market, Merlyn said, "is a very unforgiving one." It made no exception for Walker. By 1985, the venture well was dry, and the company deep in debt. President Richard Currier left, followed within months by founder Jeffrey Walker, now chief financial officer at Oracle Corp. A consortium of venture capitalists, their investments in grave danger, drafted Bruce Coleman, a veteran industry

Continued on page 113

Honeywell warns of decline

BY NELL MARGOLIS
CW STAFF

MINNEAPOLIS — Honeywell, Inc. last week warned investors of an imminent "substantial decline" in third-quarter earnings from the $70 million reported for last year's comparable period, principally due to continuing problems in its Defense Avionics Systems division.

The announcement, which included the company's prediction of declining earnings for the year, sent a shiver of deja vu through Wall Street: Honeywell presaged its second-quarter earnings report with a similar warning and ended up taking a $27 million after-tax write-off of "unrecoverable contract costs" in connection with the avionics division, a former Sperry unit acquired from Unisys in 1986.

Now the bad news is turning out to be not over until it's over. A Honeywell spokesman said that "a continuing examination by a new management team found that inadequate contract cost-recognition practices and asset write-offs at [the avionics division] were deeper and more widespread than originally thought."

Last week's disclosure "was surprising and disillusioning," said an analyst with a major Wall Street firm who requested anonymity. "I'd like to be optimistic, but we don't know if this disease will spread." Calling the credibility of Honeywell management "nonexistent" at this point, the analyst noted that his firm is "cutting our estimates drastically."

In a prepared statement, Honeywell Chief Executive Officer James J. Renier noted the company's determination "to resolve the financial issues in our military avionics business and put them behind us."

The analyst commented, "Since [Honeywell] apparently didn't do a very good job of due diligence on the Sperry purchase, it's hard to put much faith in anything they say they're doing now to cure the problems."

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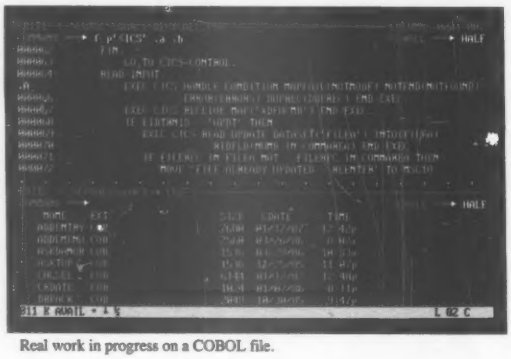

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IN BRIEF

HP buy-backs

Never let it be said that **Hewlett-Packard Co.** does not recognize a good company to buy into when it sees one. Under a program initiated in 1983, the Palo Alto, Calif.-based company's board of directors earlier this month voted to spend $200 million for open-market stock repurchases. The authorization follows the board's March go-ahead for a $750 million stock repurchase expenditure, bringing the total buyback amount authorized under the ongoing program to $2.7 billion.

Done deal

Beaverton, Ore.-based **Floating Point Systems, Inc.** earlier this month completed its $2.50 million stock-for-assets acquisition of San Diego-based **Celerity Computing.** The deal had been in process since April.

EDS in the East

Moving to expand its Asian operations base, **Electronic Data Systems Corp.** (EDS) picked up a 50% equity interest in Taiwan-based **China Management Systems** (CMS). Under terms of the agreement, EDS will take over management control of the $10 million, 300-employee CMS, Taiwan's largest private information processing services company.

Japan relents

Also on the subject of Eastward expansion: The 56 Japanese semiconductor user companies that make up the Users Committee of the **Electronics Industries Association of Japan** (EIAJ) last week announced a program aimed at easing the way for foreign companies to market semiconductor products in Japan. Dubbed the Action Plan, the EIAJ manifesto, now pending acceptance by Japan's Semiconductor Industry Association, details the steps a hopeful foreign semiconductor vendor might take to successfully get going in Japan and designates the User Committee a source of helpful seminars, surveys and research materials.

Computerland chief quits

Computerland Corp. President Kenneth R. Waters has resigned, marking the latest chapter in the retail computer chain's ongoing saga of management and ownership changes. Waters, a 10-year company veteran, managed the firm through a 1985 restructuring, the departure of founder William Millard and the recent attempt to go public. Chairman William Y. Tauscher has assumed Waters' responsibilities.

Honeywell heads back East

Honeywell Bull, Inc. is returning to its roots. The Minneapolis-based company will be pulling up stakes and moving its world headquarters to Billerica, Mass., effective Nov. 1. The information systems company originated in the Bay State in 1955.

Unisys buys Convergent

Unisys Corp. and **Convergent, Inc.** have completed their final plans for Unisys to acquire Convergent for $7 per share. Detroit-based Unisys said it expects the purchase of the computer systems manufacturer to be completed by the end of the year.

Corvus revenue droops

Delays in shipping new products caused yearly fiscal results of local-area network manufacturer **Corvus Systems, Inc.** to sag badly. Yearly revenue for the San Jose, Calif., firm dipped 30% to $25.4 million. Net income, however, finally climbed out of the cellar and reached $2.3 million, or 8 cents a share, compared with a loss of $19.8 million, or 67 cents per share, for fiscal 1987.

It doesn't Triad up

The following appeared on the Businesswire last week. We're not sure why.

"Triad Systems Corp. (NASDAQ:TRSC), through a special committee of its two independent directors, announced Friday that the special committee has been formed in connection with a feasibility study being carried out by James R. Porter, the company's president and chief executive officer, regarding a possible management-led leveraged buyout, which, according to Porter, is being considered in the $15-per-share price range.

"Although Porter's legal advisors have initiated preliminary conversation with the special committee's counsel, Porter has advised the committee that several important issues regarding his study of the terms of a possible transaction and the related financing remain to be resolved, that the resolution of these issues will significantly affect his decision as to whether or not a possible transaction will be submitted for the special committee's consideration and, if so, on what terms, and that there is no assurance that he will submit any such possible transaction.

"The special committee emphasized that there is no assurance that, if Porter decides to submit a possible transaction for its consideration, a mutually acceptable agreement can be negotiated with the company and consummated."

HP fine

CONTINUED FROM PAGE 107

rita Padilla, deputy attorney general. If those violations are found to have continued from the time of inspection to the present, either intentionally or from neglect, the state could fine HP $25,000 per day, retroactively. If the violations were unintentional, the fines would be $10,000 per day.

"We are disappointed the state found it necessary to file a lawsuit to resolve the violations," said Kevin O'Conner, an HP spokesman. He claimed that the matter was "essentially a series of record-keeping violations. None posed a threat to public health."

According to the state's complaint, filed earlier this month, HP was found to have leaking acid wastes, poorly labeled wastes and deficient, and in some cases missing, records. HP had not notified the state it was operating an expanded facility from the one it was licensed to run, and the company had not furnished emergency plans to local government agencies.

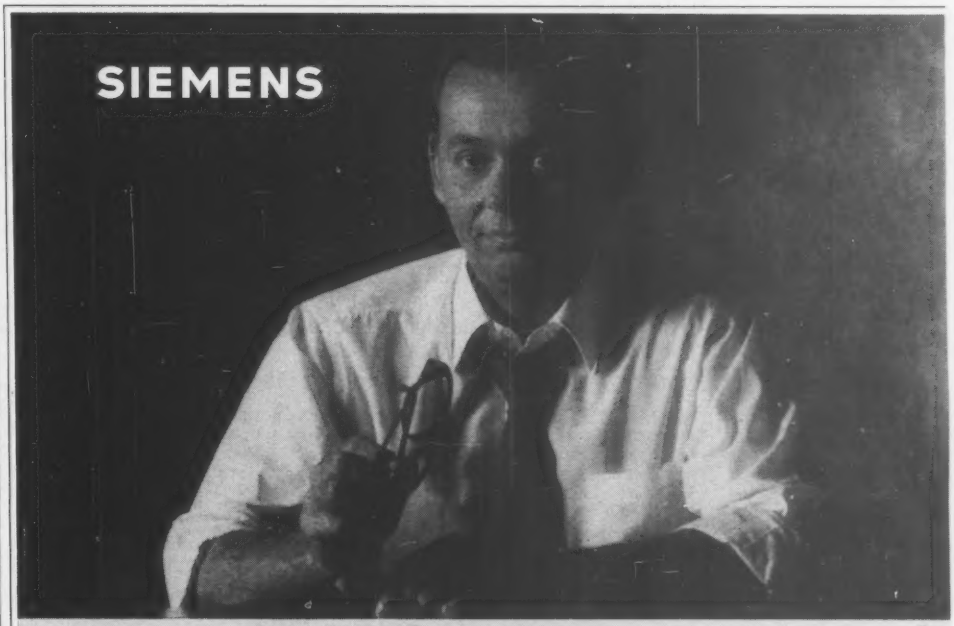
The company claimed it does have an emergency response plan, but there are disagreements between the company and the state about what should be included in the plan. "We're splitting hairs on some issues," O'Conner said.

HP was also cited for lack of monitoring. "Monitoring is important — the whole system is based on self-reporting. If they're not even doing that, we're flying blind," said Ted Smith, director of the Silicon Valley Toxics Coalition.

The state originally fined HP $86,000 in April. The firm contested the fine. The attorney general's office said negotiations with the company are continuing.

At the same time as the state was taking action against HP, an Oceanside, Calif., firm, Athens Corp., announced a purification system that significantly reduces toxic wastes from very large-scale integration and ultralarge-scale integration chips.

The new method, which could affect dynamic random-access memory, erasable programmable read-only memory and CMOS chips, is an automated process that cleans the wafers through ion-exchange and ultrafiltration technologies.



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Vice President
Corporate Information Systems
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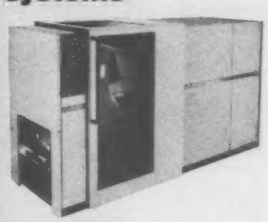

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Norsk seeks exit from mini arena

BY AMIEL KORNEL
IDG NEWS SERVICE

OSLO — Once one of Europe's fastest growing computer vendors, Norsk Data faces hard times as it seeks to adapt to radical changes in the European marketplace.

Throughout the first half of the '80s, Norsk Data sped down the industry's fast lane as growing numbers of enthusiastic buyers, including the European Center for Nuclear Research in Geneva, bought its powerful A/S line of minicomputers.

But the company went into a skid last year as the market shifted course. And in July, the pride of Norwegian industry reported its first-ever half-year loss.

"They are making the right kind of management decisions," said Pat Davis, analyst at stock broker James Capel & Co. in London. "The question is whether they can make that strategy work."

Norsk Data has been hit by a slowdown in the Norwegian economy and slackening demand for minicomputers generally, said Rolf Skar, the company's president and co-founder. "Most of the lack of growth has happened with the high-end machines," he said.

Consequently, Skar is seeking to mold a new identity for Norsk as a systems integrator and supplier of networked information systems.

To extend its reach into the workstation market, Norsk Data acquired control of Britain's Wordplex Information Systems PLC in August 1987. Although Skar described the purchase as "ideal," he nonetheless attributed a dramatic rise in costs during the first half of this year to the integration of Wordplex. Analysts point out that Wordplex had been financially troubled for some time.

Unix has taken a front seat in Norsk's networking drive. Skar said clients increasingly ask for Unix workstations to be connected to minis running its Sintran operating system.

Analysts warn, however, that the pace at which the Norwegian firm moves into open architectures could negatively impact its installed base. "You have to be careful that the pricing on open systems doesn't make proprietary stuff look expensive," said Philip De Marcillac, director of European computer market research at Dataquest Ltd.'s London office.

De Marcillac estimated that Unix sales account for no more than 10% of Norsk Data's current business. He said it will take another three years before its Unix activity "has enough critical mass to drive the business."

"Norsk Data in the future will be much more a systems integrator than systems seller," said Per Holte Rosenkilde, manager of International Data Corp.'s (IDC) Oslo office.

For the moment, however, and despite Skar's assertions to the contrary, the company is still clearly in the minicomputer business. According to IDC Europa, Norsk Data at the end of 1987 had the largest installed base (27% of 22,500 units) of small-scale computers (multiuser systems valued at less than $100,000) out of any vendor in Norway. It came in No. 2 after IBM in terms of annual shipments (6% of 4,400 units).

Margolis

FROM PAGE 107

Fast-track business, for example, came over on the Mayflower; it went national when the railroads were built. Such a pedigree, however, didn't stop *The Wall Street Journal* from pegging Reba McIntire's 1986 country-and-western crossover hit, "When Whoever's In New England's Through With You" — which presents a young Southern wife worrying about just how proactive her husband is on his frequent business trips to Massachusetts — as signaling the assimilation into pop culture of the Yuppie-style business mode.

Business, yes — but how about computer business? Where are the bards of baud? When are we going to hear Carson on CASE? Leno on LANs? When will we see David Byrne in an outsize white suit with pens in the pocket, starring in *Stop Making 9370s*?

Soon, perhaps. The phenomenon isn't yet in full flower, but it's budding. Witness, for instance, the following items:

- An espionage thriller I read several months ago described an American businessman, bumped off by the bad guys, as a software company executive in Europe to drum up continental customers for his company's database product.
- In the summer box office hit *Big*, Tom Hanks' character — a preteen magically transported into an adult's body — performed an equally astounding education/experience/maturity bypass and landed himself a job in the systems entry department of a major corporation, splendidly prepared by a childhood steeped in computer games and omnipresent PCs.
- The popular television game show *Jeopardy!* last month asked the contestants to identify "What it is that there are millions of per second in the computer term MIPS."

WHERE ARE the bards of baud? When are we going to hear Carson on CASE? Leno on LANs? When will we see David Byrne in an outsize white suit with pens in the pocket, starring in *Stop Making 9370s*?

A best-seller-type novel is good; a best-selling movie, better still. But MIPS on Jeopardy! I mean, Alex blooming *Trebek!* Silicon *Network*! This, my friends, is validation.

And so what if none of the otherwise esoterically prodigious *Jeopardy!* contestants got the damned thing right?

What is 'Moron'?

So what if, the very next week, on the very same show, a contestant billed as a "computer expert" couldn't identify what the M stood for in "the computer terms RAM and ROM"?

So what if there are still people out there who think Ashton-Tate was a British actor in the '40s and that megaflops has something to do with the collective oeuvre of John Travolta? It's good to know that there's still some frontierland left to settle.

Meanwhile, MIPS on *Jeopardy!* It's the end of the world as we know it. It's the beginning of the flowering of the computer industry in American culture. This bud's for you.

Margolis is a *Computerworld* senior writer

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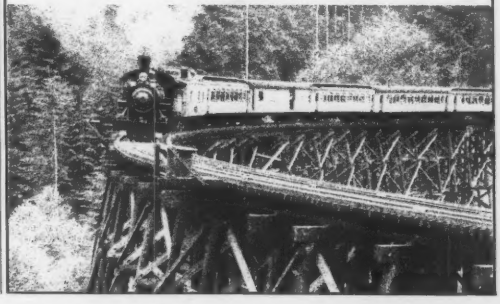

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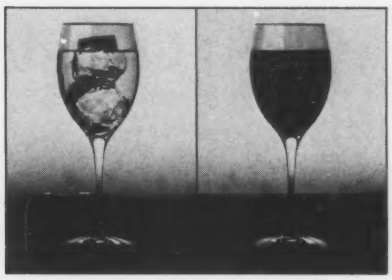

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Walker

CONTINUED FROM PAGE 107

executive known for his turnaround prowess, to either put Walker in the black or put it on the block.

Under Coleman's guidance, in addition to cutting the staff by approximately 66% and entering into a pact to pay its creditors at 36 cents on the dollar, the company made a smart move: "They put Dave Brownlee in charge," Merlyn said.

Brownlee, who was heading up Walker's European operations when the call came to take over as CEO, "is someone who doesn't get busy until you tell him it's all over," Merlyn said. "And it was apparent to anyone with brains and eyes that Walker was history." Brownlee got busy.

"We had no choice," Merlyn said. "No one was going to buy us in the state we were in — so we had time. We took advantage of the 2½ years that we inadvertently took off from marketing and put our house in order."

Finding direction

First, the newly lean staff "spent six to eight months just servicing our customers," Brownlee explained. Then the company rededicated itself to corporate strategy, this time keeping tightly focused on where the market for mainframe financial applications software was going.

Convinced that its combination of relatively portable software and layered software development tools has met its ideal market in the users who have flocked to DB2, Walker recently released its entire line of software products under DB2.

"They've refocused very successfully," said Paul Hessinger, chief technology officer at the Buffalo-based systems consulting firm Computer Task Group, Inc. "Their DB2 strategy is eminently sensible," Hessinger said. "If you're going to pin your hopes on anything, make it something with long-term viability and expansion inherent in it." The market-leading IBM database is certainly that, he said.

"But the best thing Walker has going for them always has been, and still is, the quality of their applications," he added.

Walker's second chance was facilitated by the fact that "we didn't take over a failing company — we took over a failing financial situation," Brownlee said.

"Their software has always been excellent," agreed Fred Baynes, manager of financial systems at Richmond, Va.-based Reynolds Metals Co. Today a $4.3 billion manufacturing company, Reynolds signed on with Walker in 1983.

"We were looking for financial application software that reflected the latest technology, met our business requirements and was flexible enough to address our future business requirements," Baynes said. Reynolds stuck with Walker and is now among the first in line as a beta-test site for the series of DB2 applications introduced in July.

Meanwhile, the company that appeared to be down for the count in 1985 now counts more than 600 installed products at more than 350 customer sites, $1.47 million in new equity funding and profits in its 12 most recent consecutive quarters. The company is predicting some 100 new customers this year based on the DB2 line alone, Brownlee said.

And is Walker still looking for a buyer? Yes, Brownlee said — and you're it. "We'll go public when the time is right," he said.

Datapoint

CONTINUED FROM PAGE 107

Potter attributed the company's sixth consecutive profitable quarter — making 1988 Datapoint's first profitable year since 1984 — to "growth in revenue from the company's international operations as well as controlled spending worldwide."

The "controlled spending" in question, said Hunt, did not involve substantial layoffs. Total work-force reduction over the past year, he said, was in the 1% to 2% range.

Rather, Hunt said, "We've been lessening overhead and indirect spending of a variety of sorts and also focusing our investments in the marketplace."

In addition, said Don Bynum, company vice-president of worldwide marketing, a spate of new product releases during the year was instrumental in fueling Datapoint's continuing profitability.

Among the recent Datapoint introductions were a new line of 386-based high-end processors, a number of new peripherals, operating system software, a new generation of communications servers and an array of communications products, Bynum said.

Bynum also cited increased support of industry standards as adding to Datapoint's improved profit picture. Last week in fact, the company, long known as a proprietary network player, entered the IBM Netbios-compatible LAN market.

> "WE'VE MADE a more aggressive marketing effort altogether."
>
> DON BYNUM
> DATAPOINT

"We've made a more aggressive marketing effort altogether," Bynum said. "We've paid more attention to user groups over the past year; I've put a lot of miles on my body, and I know Bob Potter's put a lot on his." Datapoint has also redoubled its efforts in trade-show attendance and advertising, Bynum said.

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NICKELS & DIMES

Memorex Telex N.V. reported results for the period ended June 30, its first fiscal quarter. The company said that revenue was $518.3 million, and operating income before tax, interest and other charges was $44.6 million. The quarter was the first period to reflect three months of operations by both companies involved in the merger of Memorex and Telex.

Harris Corp. reported net income of $100.5 million for the year ended June 30, compared with $4.5 million last year.

Revenue for the fourth quarter was $538.4 million, compared with $562.1 million last year. Profits were $1.8 million, or 5 cents per share, compared with $26.2 million, or 63 cents per share, in the previous year.

Altos Computer Systems, Inc. announced revenue of $45.7 million for the fourth quarter ended June 25, compared with $40.5 million last year. Profits were $13.1 million (including a gain of $11 million from the sale of the company's investment in Informix Corp.), compared with $3 million (including a $1.1 million gain from the sale of a portion of the Informix investment) in the fourth quarter of the previous year. Earnings per share were $1.08 (including 91 cents per share from the sale of the Informix investment), compared with 23 cents per share (including 9 cents per share from the sale of a portion of the Informix investment) a year ago.

For this year, revenue was $175.8 million, compared with $153.9 million a year earlier. Net income was $22.2 million (including a $14.1 million gain from the sale of the Informix investment), compared with $9.7 million a year ago (including a $1.1 million gain from the sale of a portion of the Informix investment). Earnings per share were $1.78 (including $1.13 per share from the sale of the Informix investment), compared with 73 cents per share a year ago (including a 9-cent gain from the sale of a portion of the Informix investment).

Priam Corp. announced revenue for the fourth quarter ended June 30 of $38.7 million, compared with $35.1 million last year. Net income was $1.4 million, or 6 cents per share, compared with a net loss of $2.8 million, or 12 cents per share, in the like period a year ago.

For the year, revenue was $142.0 million, compared with $129.6 million a year ago. Net income was $543,000, or 2 cents per share, compared with a net loss of $41.3 million, or $1.74 per share, in the comparable period last year.

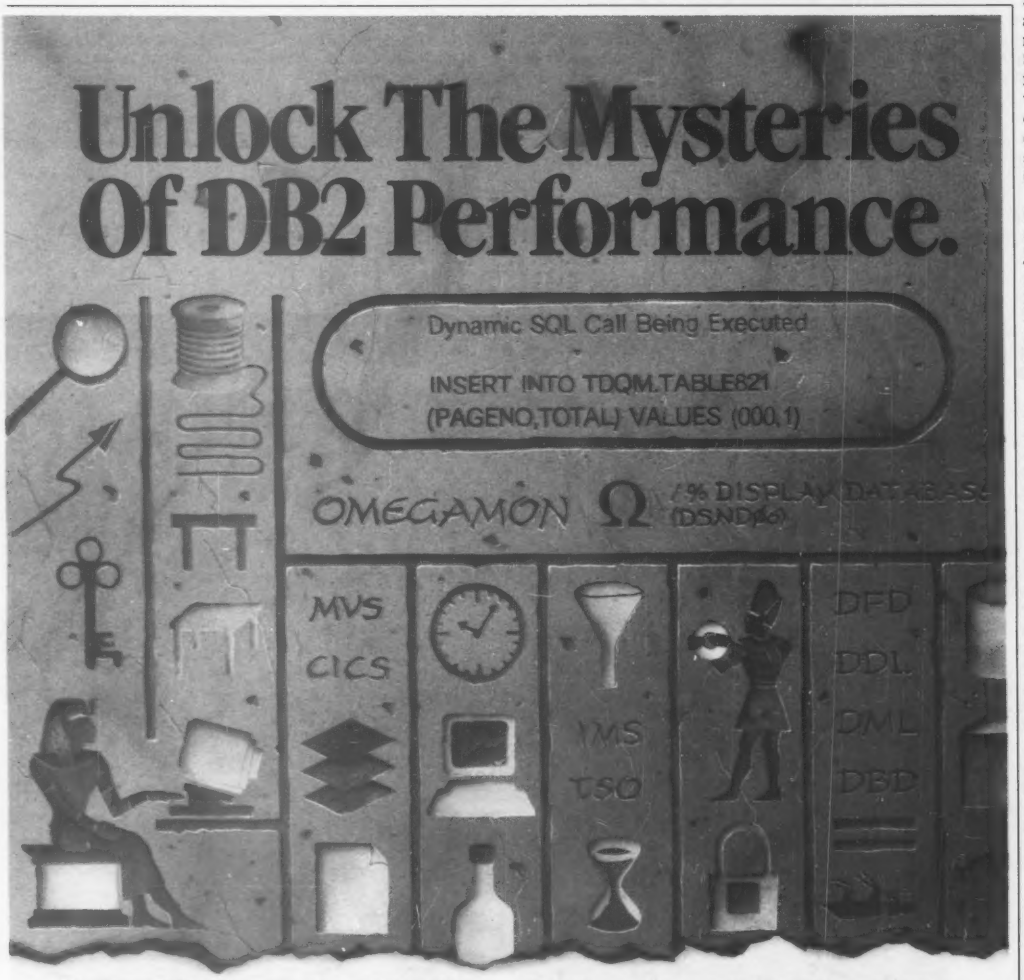
Western Digital Corp. announced revenue for the fourth quarter ended June 30 of $276.8 million, compared with $145.1 million last year. Profits were $14.7 million, or 52 cents per share, compared with $14.4 million, or 51 cents per share, in the like period last year.

Revenue for the year was $768.3 million, compared with $481.4 million last year. Profits were $43.4 million, or $1.53 per share, compared with $45.8 million, or $1.79 per share, in the comparable period a year ago.

EMC Corp. reported revenue of $29 million for the second quarter ended July 2, compared with $28.8 million last year. The company reported a net loss of $3.4 million, or 15 cents per share, compared with a net profit of $6.8 million, or 29 cents per share, in the like period last year.

Gould, Inc. announced revenue for the second quarter ended June 30 of $196.4 million, compared with $189.8 million a year ago. Profits were $62.3 million, or 15 cents per share, compared with $3.5 million, or 8 cents per share, in the like quarter of the previous year.

Pyramid Technology Corp. reported revenue for the third quarter ended July 1 of $20.2 million, compared with $13.7 million in the previous year. Profits were $2.3 million, or 26 cents per share, compared with $801,000, or 9 cents per share.



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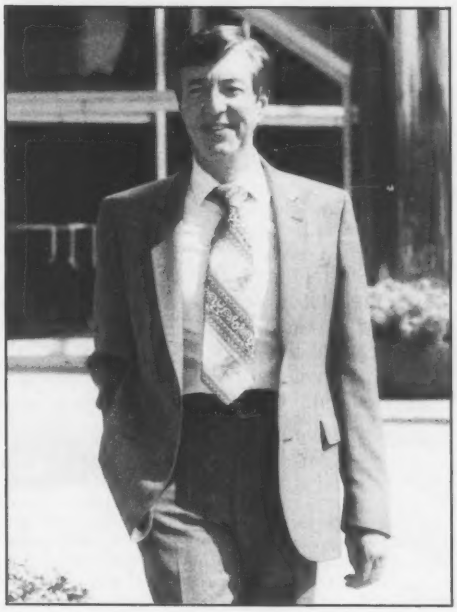

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— Chuck Youngblood
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"We get this equipment mostly from companies that relocate. And the way we find it is the same way we resell it — through our ads in *Computerworld* Marketplace. While those ads help us to buy as well as sell, I'm really tickled by the way they've delivered new customers to us.

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Survivor

CONTINUED FROM PAGE 107

MCI's goal is to increase market share to 15% to 20% in the next five years and maybe up to 30% by 2000. Will MCI top out at 30% market share?

I don't think we know. What you have to do is be big enough to be recognized as a candidate for anybody's communications needs. On top of that, you need to be big enough to afford the systems, services, support and personnel. You also want to be big enough to be self-sustaining and be classified as one of the best.

Some number, around 25% of the market or more, has got to be within your capability for you to be considered a full-service carrier.

What's your strategy for reaching that 25% market share?

We're going to introduce new services as fast as we can. We're going to provide multiple services to the multiple market segments, from residential to the most sophisticated multinational [corporation].

AT&T has its Ma Bell identity. U.S. Sprint has a fiber-optic identity. Is MCI having trouble establishing an identity, now that its image as a discount provider is waning?

I'd rather have a reputation as a good company to do business with than try to do it on one feature. AT&T's message is intimidation; if you pick other than AT&T and something goes wrong, you're fired. Sprint is saying they have clear telephone calls, but communications managers won't be fooled.

We win the battle against AT&T when the communications manager selects two suppliers to keep one worried about the other. I have a hard time arguing against that, because that's basically our philosophy with our suppliers. But you don't need more than two, so managers basically select us and AT&T.

People used to think of MCI as a voice-only carrier. Are you making inroads into the data communications side?

We're starting to do quite well in data communications. We were very fortunate in that as part of the SBS [Satellite Business Systems] acquisition from IBM we picked up several hundred very competent data communications people. We've come a long way in the data market, which is growing faster than the voice market, and we're ahead of AT&T in international data traffic.

Do you fear being gobbled up by a regional Bell holding company if Judge Greene allows them into the long-distance market?

That depends. . . . Maybe MCI will gobble up one of them. Either way, that would destroy the structure of the industry.

> "WE WIN the battle against AT&T when the communications manager selects two suppliers to keep one worried about the other."
>
> WILLIAM G. McGOWAN
> MCI COMMUNICATIONS

What [the regional Bell companies] are really trying to do is to reconstruct what they remember as the good old days. And what they remember is having your own equipment and your own long-distance service.

I doubt whether the judge or his successor, looking at the record, will do that.

How has your work routine been affected by the heart attack and heart transplant?

I don't work seven days a week any longer. As a matter of fact, since the beginning of the summer, I haven't worked a Saturday. But it doesn't restrict me very much. I travel, at least one trip a week someplace.

Under the circumstances, some people would have retired. Why didn't you?

I assume that a good definition of retirement is that you have an unrestricted choice about what you want to do. But that is what I'm doing. Retire to do what? I'd retire to do the same thing that I do here. I enjoy [work] very much. And I do make significant contributions in the areas of structure, personnel, where we're going, why we're going there, how we're going there, the philosophy and implementation of it.

We're a young company; the average age here is under 31. I always said that if I retired it would probably go to 26.

I could have retired before the heart attack. I didn't need to work, but I love it. So as long as I can make that kind of contribution, then that's what I'll do. You couldn't ask for a better industry to be in.

What do you think of the presidential campaign?

The tendency of a Republican administration would be to continue more of the laissez-faire, hands-off [approach to the industry]. A Democratic administration is going to be a little bit more hands-on. As long as it's a little bit either way, it really won't make all that much of a difference. Therefore, I really don't see any dramatic changes.

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Computerworld Extra on IBM
Issue Date: November 16 Ad Close: October 14

Despite growing challenges, IBM is still the industry leader. And after 1987 saw a year of promises from Big Blue, 1988 brought a year of reorganization in an effort to fulfill those promises.

On November 16, *Computerworld Extra*, a special publication from *Computerworld*, will take a close look at that reorganization. It will focus on the products and directions that Big Blue announced during the last 12 months—and reveal how users have reacted to them. It's an important story, and one you won't want to miss!

Computerworld Extra will look closely at IBM's reorganization with planned topics like:

- **IBM's new mainframe strategy.** Experts believe the company must reposition the mainframe as a database machine and network hub. We'll look at new and future mainframe technology from Big Blue.
- **A beefed up software front.** Two new software-only divisions should make IBM an even greater force in the applications market. Here's a look at the strategies and likelihood of success for these new segments.
- **The perils of reorganization.** We'll examine the effects of a radical restructuring—including the redeployment of thousands of employees from the factory to the field.
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COMPUTERWORLD Extra

An IDG Communications Publication

COMPUTER CAREERS

A software Cinderella story

DP veteran from the wrong side of the tracks cleans up as entrepreneur

BY DAVID A. LUDLUM
CW STAFF

Among MIS managers and professionals who have considered another calling, the most popular choice is self-employment or owning a business, according to *Computerworld's* recent Job Satisfaction Survey (CW, Sept. 12). That pursuit was the choice of 14% of the respondents contemplating a change.

But far fewer MIS professionals actually take the plunge into business than would like to. One who did is Patrick McGettigan, who started a software company after 17 years in data processing at Blue Cross and Blue Shield of the National Capitol Area. Earlier this year, McGettigan was named a regional Entrepreneur of the Year by *Venture* magazine.

McGettigan's father left the family when his son was 8 years old. Young McGettigan spent several years in a Catholic boy's home in Washington, D.C., when his mother could not make ends meet. He left high school after his junior year to help support the family, finishing by taking night classes.

Now, at 47, McGettigan is a founder and the chairman and president of 5-year-old Landmark Systems Corp. in Vienna, Va., a developer of performance management software for IBM's CICS teleprocessing monitor.

McGettigan developed the performance management software in 1979 while at Blue Cross. In 1983, he and fellow employee Katherine Clark acquired rights to sell the software and quit with money to live for six months and no outside financing.

Company fortunes

Landmark says its product, The Monitor for CICS, is now installed at 3,000 sites in 40 countries. The company employs 125 people and is listed as the third-fastest growing technology firm in the area by *Washington Technology*. This year it introduced a second product, a dump analysis tool for CICS, and McGettigan says 1988 sales for the company will reach $20 million.

He says he did not envision marketing software while developing it at Blue Cross. After being passed over for promotion to management, with insight from moonlighting as a consultant, McGettigan sensed that the performance monitor could fill a void in the market. He was encouraged by fellow workers.

McGettigan and Clark, who is now senior vice-president of the technical division at Landmark, negotiated royalties for the rights to market the software and arranged permission to use Blue Cross computers. The two left the company on "smooth and friendly terms," according to Dave Hostetler, Blue Cross manager of systems programming.

McGettigan says he had no second thoughts about his departure. "The hurdle is when you decide to go," he says. "When I walked out that door after 17 years it was really like being reborn."

Within a month of leaving, the pair gave up the consulting work both were doing to concentrate on the business. "We believe to this day the word 'focus' is important," McGettigan says.

Another early move was signing on with a small marketing firm. Knowing what you do not know and finding someone who does know it is key, he says.

Clark calls McGettigan "the one who has the ideas and the vision" but says he is not strong on implementing, which is where she has helped. "We're much stronger as a team than either is as an individual," she says.

The partners found further expertise they lacked in an independent sales representative in Europe, where they did most of their 1983 business. They also relied on counsel from a lawyer and an advertising firm. Most of their early spending went for brochures and advertisements.

In the fall they realized the limited version of the product they were selling might support a mom-and-pop operation but not the company they envisioned. "We really went back to the drawing board in a big way," McGettigan says. He advises others to do more early planning than they did.

Landmark Systems' McGettigan

With some sales in half a dozen European countries, the first revenue came in just about the time the partners ran out of savings. In October 1983, they took on a third partner, Jeffrey Bergman, to head up sales. The full product was ready in January 1984 and generated a flurry of revenue in April. It was only then that the two wrote up a business plan. In July 1984, they hired their first full-time employee.

McGettigan credits his achievements in part to a stubborn curiosity. "I used to be always sticking my nose into solving problems or improving processes," he says.

While calling himself insecure, he also says he has a mercurial personality. "I rock the boat, I challenge. I make diplomatic mistakes. I never quite fit into a nice management team."

Treat 'em right

McGettigan says his basic business philosophy is to treat people properly — suppliers and competitors as well as employees. "You've got to work at it," he says. "It takes deliberate, conscious effort to work well with people."

At Landmark, each member of the technical staff has a private office, work hours are flexible and overtime generally is not required, according to Carol Covin, author of *The Computer Professional's Job Guide for the Washington, D.C., Area*. Employees get profit sharing, 12 days of sick leave a year and 15 vacation days after one year.

"If you can turn those people loose toward whatever their potential is, give them a nurturing environment, they're going to produce," McGettigan says.

He and Clark developed an especially intimate working relationship. They were married in December 1983.

Ludlum is a *Computerworld* senior writer.

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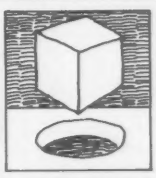

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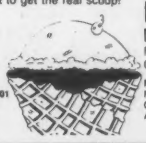

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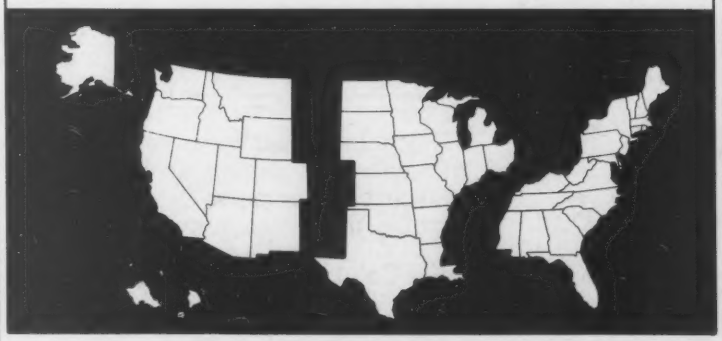

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Roger Fraumann is Staff Director for Lachman Associates, Inc. (LAI) of Westmont, Illinois. It is one of the largest privately held computer systems software consulting and development firms in the United States.

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CAREER INDEX

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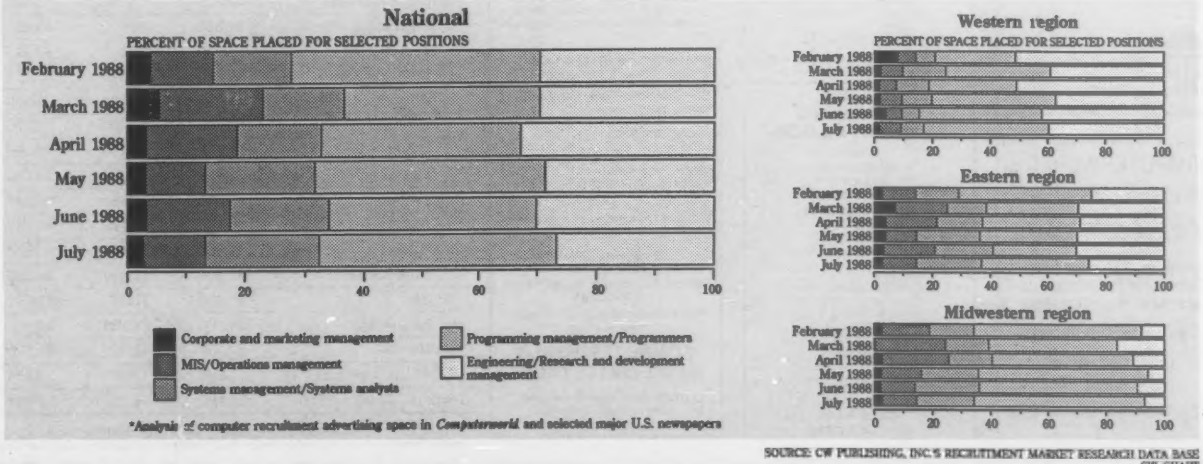

*Analysis of computer recruitment advertising space in *Computerworld* and selected major U.S. newspapers

SOURCE: CW PUBLISHING, INC.'S RECRUITMENT MARKET RESEARCH DATA BASE
CW CHART

MARKETPLACE

AT&T PBXs in short supply

Company's tough recertification stance discourages System 85 resellers

BY JONATHAN L. ROGERS
IDC FINANCIAL SERVICES CORP.

The AT&T System 25 has not yet become widely available on the secondary market, although the current retail fair market value for the devices that have sold is 77%. Availability and demand for used System 25s is expected to be small, as primary market sales have been disappointing for AT&T.

The System 75 is currently the most desirable AT&T system in the secondary market because it satisfies the telecommunications requirements of many medium-size to large businesses. The Model 3s are in more demand than the Model 1s because of their greater capacity.

The Model 3s are trading for 72% of retail. The smaller Model 1s are trading for 65%. Depending on the level of success AT&T reaches with its plans to integrate the System 75 with the 85, the System 75 could have a long life in the secondary market, similar to the Dimension's.

Discouraging words

Many participants in the secondary market have been reluctant to sell System 85s as complete systems. This reluctance is a result of AT&T discouraging the used System 85 market, which competes with new systems.

AT&T's December 1987 price cut on new System 85s reduced the supply of used 85s because used systems were significantly devalued by the lower list price. According to resellers, AT&T has been playing hardball with the System 85 recertification process for used systems. Currently, Release 2, Version 1 models are trading for 57% of retail, Version 2s are trading for 61% of retail and Version 3s have occasionally hit the market and are trading for 64% of retail.

On August 1, AT&T initiated a program through the secondary market organization that will reward any resellers capable of displacing a competitive vendor's private branch exchange (PBX). This offer may give resellers the motivation and the bargaining position to help AT&T expand its installed base in a market in which new sales are not possible.

Credits and waivers

Specifically, AT&T is giving a credit for standard engineering charges and an installation-charge waiver on used System 75s, 85s and the Dimension line. This program is targeting the non-AT&T analog switches that are due to be replaced in favor of the newer family of digital switches, specifically the 75 and 85.

Even though this program gives an end user the greatest break to convert from a competitor to Dimension, very few will go this route because little value would be gained from migrating to older analog technology. This program will be most successful for a migration from an analog PBX to a digital System 75. This swap gives the end user AT&T's current digital architecture with the promise of tomorrow's capabilities.

For more information, contact IDC Financial Services Corp.'s Terri LeBlanc at 508-872-8200.

AT&T private branch exchanges

Current retail fair market value

	Date shipped	AT&T list price per line	Retail percent of list price
System 25	October 1986	$573	77%
System 75			
Model 1B	January '86	$720	65%
Model 3B	Fourth-quarter '86	$528	72%
System 85			
Release 2, Version 2	Second-quarter '85	$656	61%
Release 2, Version 3	First-quarter '86	$651	64%
Dimension			
400	NA*	$595	39%
600	'79	$715	37%
2000	'76	$750	42%

* Not available

SOURCE: IDC FINANCIAL SERVICES CORP.
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Where all computer buyers and sellers can go to market.

The BoCoEx index on used computers

Closing prices report for the week ending Sept. 16, 1988

	Closing price	Recent high	Recent low
IBM PC Model 076	$900	$1,125	$500
XT Model 086	$1,200	$1,250	$900
XT Model 089	$1,250	$1,450	$1,050
AT Model 099	$2,125	$2,350	$1,700
AT Model 239	$2,600	$2,900	$2,300
AT Model 339	$3,200	$3,650	$2,900
PS/2 Model 30	$1,525	$1,700	$1,300
PS/2 Model 50	$2,350	$2,600	$1,900
Compaq Portable I	$825	$950	$700
Portable II	$1,850	$2,000	$1,650
Portable III	$3,000	$3,550	$2,825
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TRAINING

Offloading troubleshooting

Clear guidelines and classroom tips can make users more self-reliant

BY NAOMI KARTEN
SPECIAL TO CW

Most end-user training for novices concentrates on product features and functions. Students get a healthy dose of how to make their software sing but often learn little about what to do when problems crop up — as problems inevitably do.

Teaching users how to do some of their own troubleshooting in addition to the mechanics of programs can generate three major benefits:

- Reducing user anxiety and uncertainty about doing things improperly.
- Promoting self-sufficiency by conveying the idea that users can resolve at least some problems themselves.
- Easing some of the demand on information center and micro center support staff.

Teaching users to diagnose and resolve computer problems is best accomplished through a combination of written and classroom approaches. Written material can take the form of a list of troubleshooting guidelines, pointers about things that often go wrong or errors that commonly occur.

The guidelines can describe how to recognize a variety of situations and some of the steps that are most likely to resolve them.

The Top 10

The diversity of ways that products can malfunction — or appear to malfunction — makes it a good idea to develop separate lists for each supported product and perhaps one master list of major ones — call it the Top 10. The problems are easily identified by documenting the ones most often called in to the support hot line and encountered in recent classes.

Many users find manuals frustrating to navigate through and difficult to read, and they will ignore troubleshooting guidelines that are not presented in a clear, concise and consistent manner.

One approach might be to divide a sheet into three columns labeled "If," "A possible explanation is" and "Try this." For example, a condition that has two or three possible explanations might look like this:

- **If:** You turn on your computer and the screen remains blank . . .
- **A possible explanation is:** There is nothing wrong with the computer, but the contrast knob on the lower left side of the monitor is set too low.
- **Try this:** Turn the contrast knob clockwise and see if anything becomes visible on the screen. If not . . .
- **A possible explanation is:** The system may not be plugged in.
- **Try this:** Check all electrical connections (plugs, sockets, cables) to be sure they are properly connected and firmly closed.

To be effective, troubleshooting guidelines must attract attention, and that means they should be disseminated in a variety of ways.

Each user department should have its own set. Guidelines pertaining to specific products should be distributed in classes devoted to those products.

Guidelines can also be included in newsletters and posted on bulletin boards for people who may not otherwise see them. The objective is twofold: to communicate the specific technical details of problem resolution and to continually stress the fact that users can resolve many of their computer problems themselves.

TEACHING END USERS troubleshooting procedures can ease some of the demand on information center and micro center support staff.

But preparing written guidelines is not enough. Instructors can increase the probability that guidelines will be used by introducing troubleshooting concepts in their classes. Instructors should point out the availability of the troubleshooting guidelines and describe how to use them. However, they should also devote class time to doing things wrong. They can lead students into common errors so that the students learn error messages and responses. If users can view glitches and snafus within the safe setting of the classroom, they become better prepared to address the same or similar problems later on.

Telephone support staff can further reinforce the idea of troubleshooting by asking callers if they have already reviewed the guidelines. The staff can also help users follow the troubleshooting pointers.

If the support hot line continues to get calls for problems addressed by the guidelines, it is a sure sign that the guidelines are not working. An end to calls about those problems may mean that the guidelines are working or that no one is experiencing the problems. The support staff needs to continually monitor the types of problems reported and update the guidelines so that they reflect current problems.

The idea behind teaching users to troubleshoot is not to force them to solve every problem but to encourage them to give it a try. It is important for users to understand that if all else fails, help is still only a phone call away.

Karten is president of Karten Associates in Randolph, Mass.

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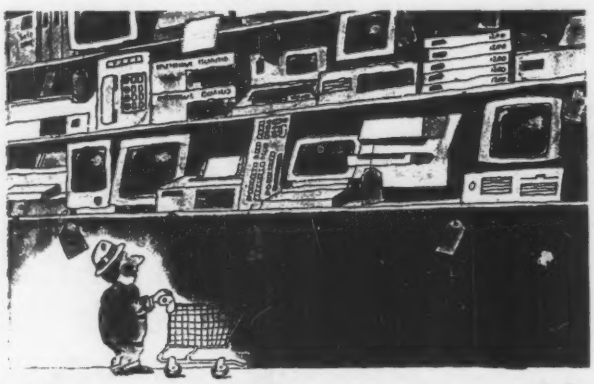

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Oct. 31	Unix	Oct. 14
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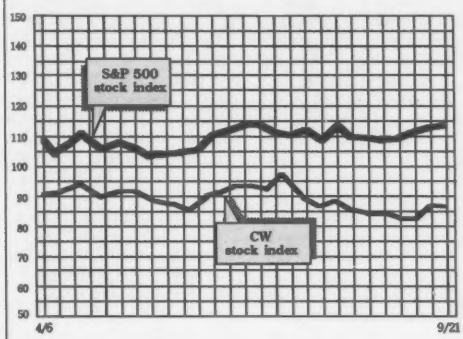

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Software & DP Services	102.2	102.9
Semiconductors	60.3	59.3
Peripherals & Subsystems	81.5	79.6
Leasing Companies	111.9	113.2
Composite Index	86.3	85.6
S&P 500 Index	113.4	113.8

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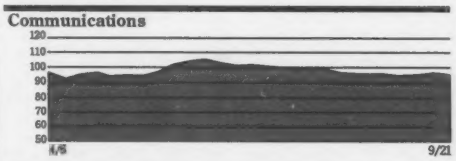

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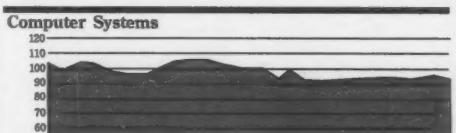

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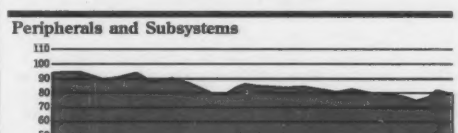

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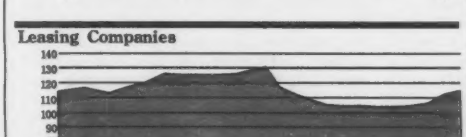

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E X C H		PRICE 52-WEEK RANGE (1)		CLOSE SEPT. 21 1988	WEEK NET CHNGE	WEEK PCT CHNGE
Communications and Network Services						
N	AMERICAN INFO TECHS CORP	100	74	94.00	1.1	1.2
Q	ANDREW CORP	19	11	16.25	-0.3	-1.5
Q	ARTEL COMM CORP	3	1	2.06	0.1	3.2
N	AT&T	35	20	26.50	1.0	3.9
Q	AVANT GARDE COMP INC	5	1	1.00	0.0	0.0
Q	AVANTEK INC	16	5	5.88	-0.4	-6.0
N	AYDIN CORP	35	16	22.25	0.1	0.6
N	BELL ATLANTIC CORP	80	61	71.38	0.3	0.4
N	BELLSOUTH CORP	44	29	39.50	-0.9	-2.2
Q	COMPRESSION LABS INC	6	2	3.13	0.0	0.0
Q	COMPUTER NETWORK TECH	5	1	1.13	-0.1	-7.8
O	CONTEL CORP	38	25	35.38	0.4	1.1
Q	DATA SWITCH CORP	10	4	7.00	0.1	1.8
Q	DIGITAL COMM ASSOC	46	20	20.88	-0.5	-2.3
Q	DYNATECH CORP	29	14	21.00	0.5	2.4
Q	FIBRONICS INTERNATIONAL INC	5	2	3.25	-0.1	-3.7
Q	GANDALF TECHNOLOGIES	8	5	6.38	0.0	0.0
Q	GENERAL DATACOMM INDS	8	3	3.50	-0.1	-3.4
N	GTE CORP	44	29	42.00	0.0	0.0
Q	INFOTRON SYS CORP	14	5	11.25	0.3	2.3
N	ITT CORP	65	42	48.88	0.1	0.3
N	M A COM INC	15	7	10.00	-0.1	-1.2
Q	MICOM COMMUNICATIONS CORP	19	7	18.63	0.1	0.7
Q	MICOM SYS INC	17	7	15.50	-0.4	-2.4
Q	NETWORK EQUIPMENT TECH INC	28	12	16.00	-1.8	-9.9
Q	NETWORK SYS CORP	13	7	9.00	-0.8	-7.7
N	NORTHERN TELECOM LTD	23	14	17.38	-0.1	-0.7
Q	NOVELL INC	31	12	29.75	-0.5	-1.7
N	NYNEX CORP	78	58	66.13	0.4	0.6
N	PACIFIC TELESIS GROUP	34	23	30.00	0.8	2.6
N	PARADYNE CORP	8	4	5.88	0.0	0.0
A	PENRIL CORP	5	1	4.25	0.1	3.0
N	PLESSEY PLC	38	23	26.75	1.3	4.9
N	SCIENTIFIC ATLANTA INC	18	8	12.13	0.1	1.0
N	SOUTHWESTERN BELL CORP	46	22	39.50	0.4	1.0
Q	3 COM CORP	26	12	15.75	-2.5	-13.7
N	U S WEST INC	60	43	56.00	0.8	1.4
Computer Systems						
Q	ALLIANT COMPUTER SYS	17	4	4.63	0.1	2.8
Q	ALPHA MICROSYSTEMS	8	3	6.00	0.0	0.0
Q	ALTOS COMPUTER SYS	15	7	8.13	0.1	1.6
A	AMDAHL CORP	28	10	18.25	-0.8	-3.9
Q	APOLLO COMPUTER INC	23	9	9.13	-0.1	-1.4
Q	APPLE COMPUTER INC	60	28	42.75	0.8	1.8
N	BOLT BERANEK & NEWMAN	25	12	15.88	0.1	0.8
Q	BRITTON LEE INC	4	1	2.44	0.0	0.0
N	COMPAQ COMPUTER CORP	79	34	55.75	0.3	0.5
Q	COMPUTER AUTOMATION INC	16	4	5.38	-0.6	-10.4
A	COMPUTER CONSOLES INC	9	2	8.50	0.0	0.0
Q	CONCURRENT COMP CORP	21	11	19.63	0.1	0.6
N	CONTROL DATA CORP DEL	38	18	22.50	-0.5	-2.2
Q	CONVENT TECH	7	3	6.31	0.1	1.0
Q	CONVEX COMPUTER CORP	15	6	7.38	0.0	0.0
N	CRAY RESH INC	99	47	73.00	-7.1	-8.9
Q	DAISY SYS CORP	12	5	8.50	-0.3	-2.9
N	DATA GEN CORP	37	16	19.25	0.0	0.0
N	DATAPOINT CORP	9	3	5.00	-0.4	-7.0
N	DIGITAL EQUIP CORP	200	92	92.63	-3.0	-3.1
N	FLOATING POINT SYS INC	10	3	2.88	-0.3	-8.0
N	GOULD INC	34	8	22.38	-0.3	-1.1
N	HARRIS CORP	41	22	25.88	-0.3	-1.0
N	HEWLETT PACKARD CO	74	36	49.00	0.5	1.0
N	HONEYWELL INC	82	49	59.50	-2.1	-3.4
N	IBM	158	102	113.25	-1.4	-1.2
Q	INFORMATION INTL INC	16	9	13.75	-0.8	-5.2
Q	IPL SYS INC	3	1	2.50	0.3	11.1
Q	MASS COMPUTER CORP	14	4	4.50	0.0	0.0
N	MATSUSHITA ELEC INDL LTD	230	103	192.00	-4.0	-2.0
Q	MEGADATA CORP	6	2	2.00	-0.3	-11.1
Q	MENTOR GRAPHICS CORP	39	14	29.00	-1.8	-5.7
N	NBI INC	12	3	3.00	0.0	0.0
N	NCR CORP	87	50	58.50	0.9	1.5
N	PRIME COMPUTER INC	28	12	13.75	0.9	6.8
Q	PYRAMID TECHNOLOGY	16	5	13.00	-0.5	-3.7
Q	STRATUS COMPUTER	35	15	23.38	-0.6	-2.6
Q	SUN MICROSYSTEM INC	44	14	36.50	-2.0	-5.2
Q	SYMBOLICS INC	4	1	1.06	-0.1	-5.5
Q	SEQUENT COMPUTER SYS INC	19	9	16.50	-0.9	-5.0
N	TANDEM COMPUTERS INC	37	12	13.50	-0.4	-2.7
N	TANDY CORP	57	28	41.63	-1.3	-2.9
Q	ULTIMATE CORP	37	9	10.00	0.1	1.3
N	UNISYS CORP	47	24	32.50	0.0	0.0
A	WANG LABS INC	19	9	9.13	0.3	2.8
Software & DP Services						
Q	ADVANCED COMP TECH	6	1	1.63	-0.1	-3.7
N	AGS COMPUTERS INC	30	11	26.25	-0.3	-0.9
Q	AMERICAN MGMT SYS INC	20	9	13.75	0.6	4.8
Q	AMERICAN SOFTWARE INC	16	6	15.86	0.9	5.8
A	ANACOMP INC	12	4	9.38	0.4	4.2
Q	ANALYSTS INTL CORP	10	4	8.50	-0.1	-1.4
Q	ASHTON TATE	33	13	26.75	-0.5	-1.8
Q	ASK COMPUTER SYS INC	16	6	12.63	-0.9	-6.5
Q	AUTODESK INC	34	12	28.25	-0.3	-0.9
N	AUTO DATA PROCESSING	53	16	37.13	1.3	3.5
Q	BOOLE & BABBAGE INC	11	5	9.75	0.3	2.6
N	COMPUTER ASSOC INTL INC	37	15	27.63	-0.3	-0.9
Q	COMPUTER HORIZONS CORP	14	7	9.75	-0.5	-4.9
N	COMPUTER SCIENCES CORP	73	38	51.25	4.5	9.6
N	COMPUTER TASK GROUP INC	16	9	13.38	0.6	4.9
Q	COGNOS INC.	14	4	6.75	-0.1	-1.8
Q	COMSHARE INC	25	12	20.50	0.0	0.0
Q	CULLINET SOFTWARE INC	14	4	6.00	-0.1	-2.0
Q	DUQUESNE SYS INC	22	10	17.25	-0.8	-4.2
A	DATA ARCHITECTS INC	16	7	13.75	0.0	0.0
N	GENERAL MTRS (CLS E)	51	30	42.50	0.8	1.8
Q	HOGAN SYS INC	10	3	4.88	-0.1	-2.5
Q	INFORMIX CORP	31	8	7.88	-0.9	-10.0
Q	INTELLICORP INC	7	2	3.63	0.6	20.8
Q	KEANE INC	16	8	13.75	-0.5	-3.5
Q	LOTUS DEV CORP	40	16	19.75	0.3	1.3
Q	MANAGEMENT SCI AMER	14	6	8.50	0.3	3.0
Q	MICRO PRO INTL CORP	7	2	3.06	0.0	0.0
Q	MICROSOFT CORP	79	37	53.75	-0.3	-0.5
Q	MORINO ASSOCIATES INC	20	7	15	1.3	9.4
Q	NATIONAL DATA CORP	32	20	22.88	-0.8	-3.2
Q	ON LINE SOFTWARE INTL INC	20	4	4.88	0.4	8.3
Q	ORACLE SYS CORP	22	8	20.00	-0.3	-1.2
N	PANSOPHIC SYS INC	28	11	13.50	0.5	3.8
Q	POLICY MGMT SYS CORP	30	15	23.00	0.5	2.2
Q	PROGRAMMING & SYS INC	14	7	12.50	-0.4	-2.9
Q	REYNOLDS & REYNOLDS CO	33	14	21.50	1.0	4.9
Q	SEI CORP	22	10	19.00	0.0	0.0
Q	SHARED MED SYS CORP	28	15	19.13	0.5	2.7
Q	SAGE SOFTWARE INC.	13	5	7.88	0.0	0.0
Q	SOFTWARE PUBG CORP	25	5	24.38	1.3	5.4
A	STERLING SOFTWARE INC	11	6	6.50	-0.1	-1.9
Q	SUNGARD DATA SYS INC	20	10	18.50	-0.8	-3.9
Q	SYSTEMATICS INC	34	19	30.75	-2.0	-6.1
N	SYS. SOFT INC.	24	7	22	-0.3	-1.1
Q	VM SOFTWARE INC	18	7	14.25	0.0	0.0
Semiconductors						
N	ADV MICRO DEVICES INC	25	8	11.00	-0.5	-4.3
N	ANALOG DEVICES INC	20	8	12.00	0.0	0.0
Q	ANALOGIC CORP	12	5	7.00	-0.4	-5.1
Q	INTEL CORP	42	18	28.50	-0.3	-0.9
Q	LSI LOGIC CORP	15	7	11.13	-0.9	-7.3
N	MOTOROLA INC	74	35	43.50	0.6	1.5
N	NATL SEMICONDUCTOR	22	8	8.88	0.3	2.9
N	TEXAS INSTRS INC	80	38	40.50	0.3	0.6
A	WESTERN DIGITAL CORP	27	11	14.63	0.1	0.9
Peripherals						
Q	ALLOY COMP.	12	2	2.75	-0.1	-4.3
N	AM INTL INC	8	3	5.63	0.1	2.3
Q	AST RESH INC	20	6	9.00	-1.0	-10.0
Q	AUTO TROL TECH CORP	6	3	5.25	-0.3	-4.5
Q	BANCTEC INC	14	5	8.38	-0.3	-2.9
Q	CIPHER DATA PRODS INC	11	4	9.50	-0.4	-3.8
A	COGNITRONICS CORP	4	2	2.81	0.1	2.3
A	DATAPRODUCTS CORP	24	7	10.50	-0.4	-3.4
A	DATARAM CORP	8	5	7.88	0.6	8.6
N	EASTMAN KODAK CO	71	39	44.88	0.1	0.3
Q	E M C CORP MASS	25	4	4.25	-0.1	-2.9
Q	EMULEX CORP	9	4	9.00	0.88	9.1
Q	EVANS & SUTHERLAND	28	14	15.00	-2.3	-13.0
Q	ICOT CORP	8	3	2.88	-0.3	-8.0
Q	INTERLEAF INC	24	10	10.75	-0.3	-2.3
Q	IOMEGA CORP	5	1	3.69	-0.2	-4.8
Q	LEE DATA CORP	6	3	3.00	-0.1	-4.0
Q	MASSTOR SYS CORP	4	1	2.38	-0.1	-2.6
Q	MAXTOR CORP	16	6	7.00	0.1	1.8
Q	MICROPOLIS CORP	34	10	10.75	-0.8	-6.5
Q	MINISCRIBE CORP	17	5	8.88	-0.9	-9.0
N	MINNESOTA MNG & MFG CO	84	45	64.13	1.1	1.8
A	MSI DATA CORP	19	8	18.63	0.9	4.9
Q	PERSONAL COMPUTER PRODUCTS INC.	7	4	5.44	-0.1	-2.2
Q	PRIAM CORP	3	1	1.63	-0.1	-7.1
Q	PRINTRONIX INC	12	7	10.63	0.3	2.4
N	QMS INC	27	7	7.88	-0.3	-3.1
Q	QUANTUM CORP	18	8	12.00	-0.3	-2.0
N	RECOGNITION EQUIP INC	17	6	8.00	0.0	0.0
Q	REXON INC	9	4	7.00	-0.8	-9.7
Q	SEAGATE TECHNOLOGY	23	8	9.38	0.0	0.0
N	STORAGE TECH CORP	4	1	2.00	0.0	0.0
Q	TANDON CORP	4	1	1.88	0.0	0.0
A	TEC INC	6	3	3.00	-0.3	-7.7
N	TEKTRONIX INC	38	21	21.88	-0.1	-0.6
Q	TELEVIDEO SYS INC	3	1	0.69	-0.2	-21.4
N	XEROX CORP	81	50	54.75	0.0	0.0
Q	XIDEX CORP	14	5	9.00	0.0	0.0
Leasing Companies						
N	CAPITAL ASSOCIATES INTERNATIONAL INC	9	4	6.88	0.1	1.9
N	COMDISCO INC	37	12	21.00	0.0	0.0
Q	CONTINENTAL INFO SYS	11	4	3.88	0.0	0.0
Q	PHOENIX AMERN INC	5	2	3.13	0.1	4.2
Q	SELECTERM INC	6	3	4.88	0.0	0.0

EXCH: N=NEW YORK; A=AMERICAN; Q=NATIONAL; O=OVER-THE-COUNTER; S=SPLIT

O-T-C PRICES ARE BID PRICES AS OF 3 P.M. OR LAST BID
(1) TO NEAREST DOLLAR

No-name brand

Same old stuff being served; no flavor, no taste, no nothing

Reflecting the no-trend trend in the market at large, tech stocks just kept on keeping on last week.

Investors, noted Shao Wang, a Smith Barney, Harris Upham & Co. analyst, continue to be plagued with "questions about where the income is going to be coming from. There's a boom in capital spending, but it may not benefit computer-related firms."

Thus, notwithstanding a well-received announcement of some 55 new or improved communications offerings, IBM ended the week at 112, down 2¼ points from 114¼. Similarly, Digital Equipment Corp., which last week consummated its longtime flirtation with Mips Computer Systems, Inc. with a favorably received technology transfer and equity purchase deal, closed at 92⅞, down 2 points from 94¾.

Computer Sciences Corp. stock rocketed 4¼ points to 51¼ midweek amid rumors of a possible takeover offer, including hints that Electronic Data Systems Corp. founder H. Ross Perot, looking to mount a competitive offensive against his former company, was among the bidders. Computer Sciences closed at 49¼, up 2¾ points.

NELL MARGOLIS

IBM

FROM PAGE 1

IBM and non-IBM local-area networks. Similar enhancements were made to the Series/1 (see story below).

• Multiple enhancements to Netview, including the ability to monitor other vendors' equipment and support for the emerging TCP/IP network management standard, CMIP (see story at right).

Analysts were quick to praise IBM's embrace of open standards, regardless of whether they characterized that support as throwing in the towel or covering all the bases. The end result, analysts predicted, will be greater acceptance of OSI among large organizations.

"This was no [mere] statement of direction," said Francis Dzubeck, president of Communications Network Architects, Inc., a consultancy in Washington, D.C. "These are real products."

"I would agree that this is our strongest statement so far on OSI," said Ellen Hancock, general manager of IBM's Communications Products Division, in an interview with *Computerworld*. "What's different is that we are not reacting but accommodating OSI with strong positioning."

IBM is working to provide users with multiple ways of handling multivendor connectivity, Hancock said, citing TCP/IP support, IBM's IDNX, SNA, OSI attachments to non-IBM networks and a joint project, announced separately last week, with Interlink Sciences to link SNA to Digital Equipment Corp.'s Decnet (see story page 59).

There was some disparagement of the 1990 delivery dates on some OSI products, but most analysts backed IBM's assessment that serious migration to OSI is still five years off. One pundit noted that the 1990 schedule coincides with DEC's target delivery of Decnet/OSI Phase V.

"It's the same thing that DEC said," added Bill Redmond, an analyst at the Gartner Group, Inc. in Stamford, Conn. "'We ain't changing the architecture, but we'll offer interoperability.'"

But more important, according to IBM watchers, is the fact that IBM has managed to placate one group of restless users while giving the green light to another.

Meeting demands

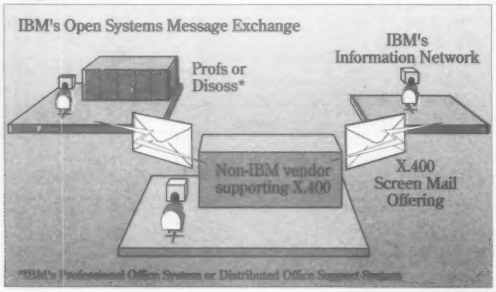
IBM reportedly has encountered pressure to support multivendor connectivity from some users who have either been reluctant to go with SNA or have threatened to scale back their SNA investments. Conversely, IBM has just provided a large group of SNA stalwarts with valid reasons to consider OSI in their strategic planning.

"What IBM is saying is that you can now target and use OSI for interconnection to third-party equipment," Dzubeck said. A recent study by Forrester Research, Inc. in Cambridge, Mass., found that a substantial number of SNA users will not seek full migration from SNA to OSI. However, most SNA users do want to link to OSI via gateways, the report added.

Also of growing concern to the Fortune 1,000 is electronic messaging. Among the services IBM added are X.400 Profs Connection and X.400 Disoss Connection. Also, X.400/OSI Interpersonal Messaging Services enhancements will reportedly soon be available to users of the IBM Information Network Screenmail Service in the U.S. and Europe.

Get the message?

IBM's X.400 offerings permit messaging between dissimilar systems using a common OSI connection



SOURCE: IBM
CW CHART

> "THIS WAS NO [mere] statement of direction — these are real products."
>
> FRANCIS DZUBECK
> COMMUNICATIONS NETWORK
> ARCHITECTS

Netview gets ties that bind

BY ELISABETH HORWITT
CW STAFF

NEW YORK — IBM boosted Netview's credibility as a multivendor network management system last week with across-the-board enhancements to the product line, including a souped-up interface for controlling other vendors' networking devices and tools for tailoring the system to the individual company's needs and configuration requirements.

Among the key products announced were the following:

• An OS/2 Extended Edition version of Netview/PC.

• A version of Netview that supports Rexx, PL/1 and C as programming languages as well as IBM's expert system shell, Knowledge Tool.

• Netview support of Common Management Information Protocol (CMIP), an Open Systems Interconnect (OSI) protocol that should allow the system to communicate with any other CMIP-compliant network management product — including those from Hewlett-Packard Co. and Digital Equipment Corp.

• Transmission Network Manager, a graphics workstation that integrates IBM's Systems Network Architecture (SNA) network management with Network Equipment Technologies, Inc. T1 switches.

A non-Netview announcement that should be welcome to MIS managers with extensive SNA networks was IBM's expansion of the address limit for such systems from 255 to 64,000. However, this capability is only available with the latest releases of VTAM and Network Control Program, "which should encourage users to do complete upgrades" to those releases, said Network Strategies, Inc. principal David Passmore.

"The 64,000 addressing capability is important to us, because our people are buying and installing departmental systems such as the 9370, and we need to interface bidirectionally to those devices as hosts, not as terminal controllers," said Joseph Giannotti, commissioner of the Computer and Data Comm Services Agency for the city of New York.

Moving uptown?

Netview/PC Version 1.2 is an OS/2 Extended Edition version of IBM's interface between Netview and third-party networking devices. Market requirements necessitate "more sophisticated applications" that are better served by OS/2's multitasking and expanded memory addressing capabilities, than by the current IBM PC-DOS version, according to IBM spokesman Robert Anderson. For example, OS/2-based Netview/PC can simultaneously collect network traffic statistics for analysis and report crucial alerts to the Netview host in real time. The product is priced at $3,000 and is slated for availability in May 1989.

Five vendors will be demonstrating how their products can interface with Netview via the new Netview/PC at this week's Tele-Communications Association '88 conference in San Diego (see story page 16).

"IBM had to announce OS/2 support for Netview/PC because it would be dead in the water without multitasking," said James Sever, manager of quality and reliability at Westinghouse Electric Communications Resources. The problem with the current PC-DOS version is that "you have to have a Netview/PC interface for each [network management] application, at 10 grand a hit" including hardware, Sever added. The OS/2 version has the potential to reduce this cost by supporting multiple applications with one interface.

By supporting IBM's high-level language, Rexx, Netview Release 3 should make life easier for MIS managers who have had trouble developing Netview applications using IBM's Command Lists in combination with assembler, Anderson indicated.

The new Netview also allows users to write routines in C language and PL/1. The latter provides an interface to IBM's Knowledge Tool, an expert system shell that can be used to embed knowledge in Netview, so that the network management system can respond automatically to certain types of events. However, Passmore said, such capabilities still require a lot of time and expertise on the MIS manager's part. He added that "what's needed is for IBM to provide heuristics as part of Netview."

Netview Release 3 has a one-time charge of $9,470 to $81,600, depending on the type of host. The IBM MVS/XA version is scheduled to be available in May of next year; the VM version is set for August 1989.

Forever young

"We won't get any older, and we'll never die."
Grandfather to grandson in the movie *Cocoon*

Talk about leading a charmed life.

The IBM Series/1 is definitely getting on in years, but it seems unlikely to die anytime soon. That's because IBM keeps dreaming up new uses for its 12-year-old workhorse processor. The PCjr should have been so lucky.

In recent years, the venerable Series/1 — which will have an installed base estimated at 60,000 by year's end — has been tapped to play a bridging role between IBM and OEMs or third-party systems.

Last week, IBM rolled out a mix of eight hardware and software enhancements said to significantly augment the Series/1's role as a programmable communications system.

These products extend the Series/1 architecture to include coprocessor technology programmable in C while also providing support for a number of systems via IBM's Token-Ring network.

Two new coprocessors, the Token-Ring Attachment Card and the Multiline Communications Coprocessor, reportedly extend the addressing capabilities of the Series/1 using Motorola, Inc.'s 68000 chips.

The Token-Ring adapter attaches any Series/1 with a 4956 processor to the network via an intelligent interface.

Related software called the EDX Token-Ring Interface Program enables Series/1 Event Driven Executive (EDE) Advanced Program-to-Program Communications applications to communicate over the Token-Ring network with either another Series/1, a 9370, an Application System/400 or a Personal System/2. It also allows a PS/2 or either of two 3174 models to communicate over the Token-Ring network to Series/1 EDE Primary Systems Network Architecture applications.

The Multiline coprocessor is customer-programmable, features 1M byte of dynamic random-access memory and supports as many as four communications lines. The card can also support Synchronous Data Link Control, high-level data link control and synchronous and asynchronous protocols.

PATRICIA KEEFE

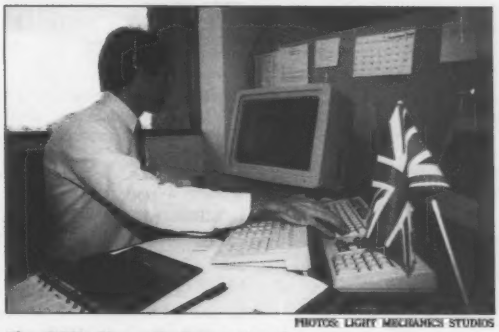
OSF

FROM PAGE 1

AT&T does not join, it may threaten OSF by removing two major reasons for OSF's existence: It may loosen up licensing requirements and give licensees equal access to development information. The employees who will feel the effects of that move, however, do not yet work for OSF.

Six months from now, few of the current OSF staff will still be there — and OSF will be in a new home in Cambridge, Mass.

Like Patience, a Siemens AG employee, the personnel are on loan from their employers — all OSF members.



PHOTOS: LIGHT MECHANICS STUDIOS

The OSF's Simon Patience *at work*

Different tasks

Patience and 34 other developers have been divided into six groups, each with different tasks. Some groups are evaluating future technologies, criteria for the soon-to-be-chosen graphical user interface and specifications for the Application Environment System Level 1.0. Additional tasks to be accomplished are defining the open process and determining how to distribute source code on an equal and timely basis, OSF officials said.

A walk through the halls of the OSF turned up several planning meetings in progress but less evidence of development work under way. The largest group of developers, a total of eight, are adapting AIX, IBM's version of Unix, to OSF's needs, presumably doing away with features deemed too IBM-specific.

The developers are doing their work on loaned equipment from member companies. Those systems, lent by Digital Equipment Corp., Nixdorf Computer Corp. and Hewlett-Packard Co., will be replaced by permanent equipment later. Buying a particular brand right away would have demonstrated favoritism toward one member, OSF officials said.

Almost certainly, the OSF staff that decides on a graphical user interface in October will not be there at all when the next interface is decided. And 25% of the temporary employees' time is to be spent replacing themselves, OSF officials said.

Headquarters, *such as it is*

Who will be the permanent employees of OSF, and why will they come?

For those signing up, there exists the excitement of a start-up, but not the promise of reward — striking it rich by going public — that is often found at a start-up.

John Paul, OSF's development chief, said OSF will pay developers competitively, but the most important inducement for them will be to participate in something historic.

The risk of such an approach is that "you're going to attract all the aspiring bureaucrats," said John McCarthy, an analyst at Cambridge, Mass.-based Forrester Research, Inc.

The temporary employees have little difficulty in shedding a bias toward their employer, according to Paul. If anything, they may bend over backward to appear unprejudiced, he said. Gary McCormick, OSF's international communications manager, likens the situation to that of a referee whose child is playing in a Little League game: "You tend to almost go the other way."

"If the world ever senses there is partiality creeping in, it could destroy the effort," offered Gary Oden, a member of the OSF's strategic communications group. He said the burden of having to publish the rationale behind a particular choice is sufficient to deter favoritism.

However, the OSF staff is obliged to listen to the wishes of sponsors and members. DEC's views, Paul acknowledges, will carry more weight than those of Adobe Systems, for example.

Even if the OSF gains a reputation for fairness, the long-term goal of being self-sustaining might be elusive. After three years, when the initial funding is expected to run out, OSF will have to generate a positive, although not-for-profit, revenue stream. Oden says revenue will come from license fees and services such as porting software.

However, OSF may have to pay a number of licensing fees for the various technologies it may use. OSF signed a standard sublicensing agreement with IBM in order to use AIX. Under the agreement, OSF will have to pay IBM a fee for each piece of AIX-based software it sells.

Questions

"You have to wonder what the financial motivation of any of the members is," said Esther Dyson, editor of "Release 1.0," based in New York, questioning the organization's chances of achieving a positive cash flow.

Just who will have control over the technology that OSF works with is another question — fraught with legal implications — that is up in the air.

"We would handle any legal questions as any software company would," McCormick said, implying that similar postures of copyright protection would be followed.

While OSF may not be person- or place-dependent, it is extremely time-dependent. Slipping from a schedule with all the world watching could cause OSF's already-fragile credibility to shatter.

Paul said that time is the No. 1 issue facing OSF — meeting schedules and getting products out the door are the greatest imperatives. The elegance of what OSF produces, he said, can always come later.

AT&T coming aboard?

Discussions between the OSF and AT&T with regard to AT&T's joining the organization are reportedly warming up. "We're optimistic," said Gary McCormick, OSF's international communications manager, regarding the chances of reaching an agreement.

The two reportedly spent last Friday deep in discussion, with OSF making a presentation to AT&T. At issue is what AT&T will get for joining the group. A source close to the discussions said the OSF may vote on AT&T's membership as early as this week.

Currently, there are 45 members of OSF, not all of which have been formally announced, due to the time needed to write press releases, according to OSF.

An OSF request issued July 19 for technology for a graphical user interface has drawn 39 responses worldwide. Requests were sent to over 2,000 individuals, OSF said. The submissions came from systems vendors, software vendors, research institutions and universities.

The submitters have been invited to present their technologies to OSF members for review at OSF's first membership meeting, to be held tomorrow through Thursday in Andover, Mass.

STANLEY GIBSON and J. A. SAVAGE

Memotec lays off 15 execs

BY AMY CORTESE
CW STAFF

In a sudden and surprising move, Memotec Data, Inc. laid off 15 top executives on Sept. 16, including the president and most of the vice-presidents of its Infinet, Inc. subsidiary in Andover, Mass., which was renamed Memotec Infinet.

One employee reported that moments after being told his job was eliminated, he saw men with screwdrivers replacing Infinet signs with ones reading Memotec and removing the released employees' signs from their parking spaces.

The layoffs came two years after the merger of Infinet, a maker of network control and management systems, with Memotec Data, a Montreal-based packet-switching vendor. Memotec is a wholly owned subsidiary of Memotec Data, which also owns Realtime, Inc. in Toronto and Teleglobe Canada, a $484 million telecommunications concern that handles most of the country's telecommunications.

The move came as a surprise to those involved as well as to industry observers. Although it was a tough year for the network-control industry, Infinet had just completed a major agreement with Bellsouth Corp. to be the primary supplier for the regional Bell operating company's corporate communications network — business potentially worth millions of dollars, according to one source.

Infinet's annual sales are estimated to be about $40 million. However, Infinet is the latest victim of a slowing market, according to Josh Gonze, an analyst at Framingham, Mass.-based International Data Corp., who pointed to recent layoffs at Paradyne Corp., Codex Corp. and General Datacomm Industries, Inc.

Gonze added that Infinet has been feeling pressure from the increased presence of IBM in the high-end modem market, particularly in Infinet's traditional banking niche.

CORRECTIONS

The last sentence of the review of Persoft, Inc.'s Ize [CW, Sept. 12] should have read: "But if you are on a continual quest for the serendipity of connecting data and your biggest fear is that by narrowing your Boolean search you're losing something that might be important, then Ize offers some intriguing possibilities."

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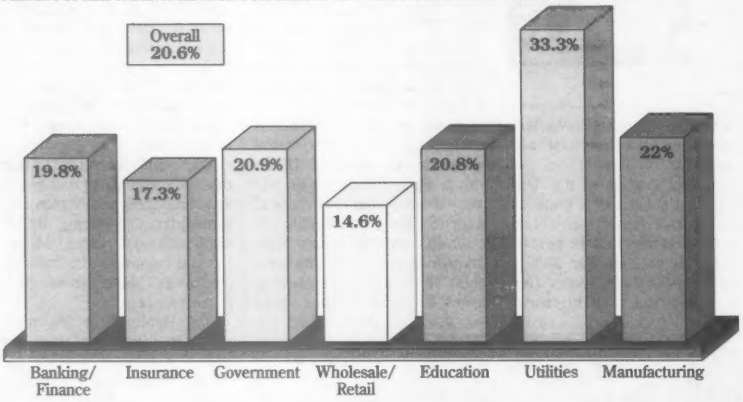
TRENDS

Job satisfaction

Utility workers are the least happy with their jobs . . .

PERCENT OF RESPONDENTS REPORTING DISSATISFACTION WITH THEIR CURRENT POSITION*



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Among seven industries examined, MIS workers at utilities generally make the most money, but they are also most likely to be dissatisfied with their jobs, according to *Computerworld's* recent salary and job satisfaction surveys.

Utility employees join workers in other industries in citing ineffective management as their biggest frustration, but they do so by the largest margin. In describing the one message they would send to top management, they are more likely than other workers to press the need to listen to and motivate employees.

Lack of career advancement is the second most frequently cited frustration by all workers. Recruiters and consultants say the industry's slow growth contributes to both high pay and lack of career advancement as workers stay in the same positions for relatively long periods.

Job opportunities at utilities also have been threatened by substantial belt-tightening in recent years as companies react to a wave of mergers and the possibility of partial deregulation.

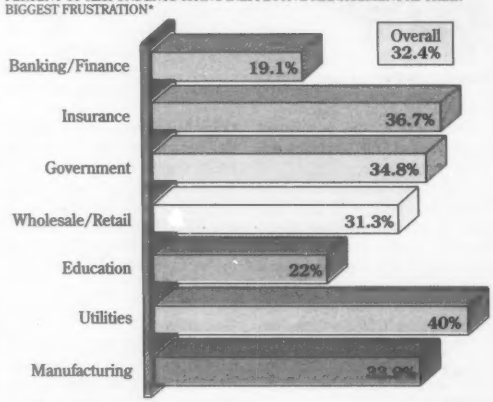
A senior systems analyst at a New Orleans utility who requested anonymity, complained of blunted career growth due to insufficient training. "Professional people are exposed to the risk of plateauing," he said. "On the other hand, it's difficult to make managers out of technical people."

He said career growth is also thwarted by a thinning of middle management due to the use of consultants and decision support systems.

DAVID A. LUDLUM

. . . and gripe most about management

PERCENT OF RESPONDENTS CITING INEFFECTIVE MANAGEMENT AS THEIR BIGGEST FRUSTRATION*



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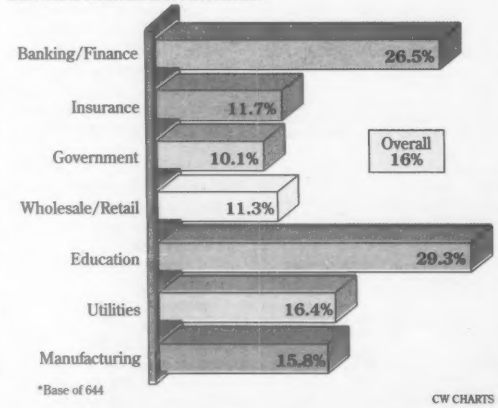
Career paths are another concern

PERCENT OF RESPONDENTS CITING LACK OF ADVANCEMENT/CAREER GROWTH AS THEIR BIGGEST FRUSTRATION*



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CW CHARTS

INSIDE LINES

Don't tip that bandwagon. Apple is expected to finally throw its hat into the TCP/IP ring next week at Interop 88, when it will announce TCP/IP software based on drivers provided by Ungermann-Bass. Apple will make its announcement as part of a daylong series of press conferences and network and protocol demonstrations for the press. By the way, in a related announcement, UB will — at long last — unveil enterprisewide TCP/IP support under its Net/One product family.

A little software humor. The entire OS/2-loving community has been stuck in software limbo waiting for the Presentation Manager (that's Pman for short) graphical user interface, set to ship next month. So when rumors kept perking that Pman might be late, we were concerned.

Microsoft, however, is "cautiously optimistic" that, barring an act of God, it will meet its date, and other vendors back the firm up.

One developer believes Microsoft and IBM will ship something next month but will leave out certain features that make it a truly full product. Instead of calling the version Pman 1.0, this developer calls it Pman Uh-oh. Hey, at least it's a start.

Hope it wasn't just a bunch of old Barry Manilow recordings. An FBI probe into alleged influence-peddling at the California State Capitol in Sacramento prompted legislative staffers to attempt to erase sensitive political information from the legislature's computer system, state newspapers reported last week. As a result, several newspapers reported, the FBI searched a legislative office last week and seized backup computer tapes. The investigation first came to light Aug. 24, when search warrants were executed on the offices of four legislators as the net closed on a three-year sting operation.

Is Sensurround next? Look for Silicon Graphics to add two new systems to its line of three-dimensional graphics workstations at a press conference scheduled for Oct. 4. Silicon Graphics will add an entry-level 3-D station in the $15,000 range and a system at the top of the line to compete with the single-user supercomputers from Ardent and Stellar. The introductions will fulfill Silicon Graphics' promise to offer a full range of 3-D graphics workstations. "It sets us up for the next four years," said Silicon Graphics' Ed McCracken, who declined to offer specifics.

We say it ain't so, Joe. Some copies of Friday's *Wall Street Journal* may be collector's items. It seems that aggressive reporting resulted in a story that said that by next year, IBM will introduce an Intel 80386-based machine without the Micro Channel Architecture. IBM said it has no plans to introduce such a machine and that a 32-bit processor with the old 16-bit PC AT bus would be silly, even for an entry-level machine. Apparently, the Journal believed IBM, because it quickly yanked the story from most editions.

Bad news for Brigham Young fans. If you were stymied while trying to call a Utah number last week, here's the reason why. Apparently, whenever Wordperfect or its neighbor Novell puts out a new release of software, it generates so many phone calls that US West is forced to put in new circuits. It *is* a small state, after all. In fact, we're told that the local telco specifically monitors for heavy voice traffic to both companies. While the problem can be remedied, the one hitch is that putting in the new circuits tends to wreak havoc with efforts to place calls in — hence the "all circuits are busy at this time" message.

***New horizons in vaporware:** Apple says it won't have any new PCs in '88, then springs a 68030 model on us without warning. Compaq again frustrates industry rumormongers by having the nerve to not announce its laptop for the fourth time in three years. Lotus Vice-President Frank King and Microsoft Vice-President Mike Maples spar over who'll be the first to ship a spreadsheet for Presentation Manager, even though Lotus announced one 18 months ago. Has everyone gone batty? Put your two cents in the hot line kitty by calling News Editor Pete Bartolik at 800-343-6474 or 508-879-0700. Nothing surprises him any more.*

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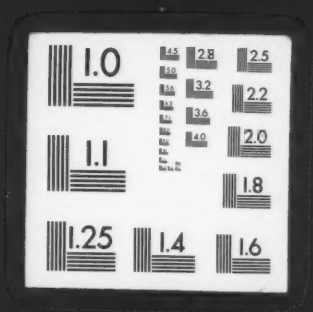
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